A Sarasvati Hieroglyph Dictionary

-- (Vol. 4 of the Quintet: *Indus Script encodes mleccha speech*) (Updated 31 March 2008)

The underlying hypotheses of the analysis core legacy from the linguistic area of this civilization; and presented herein are two-fold:

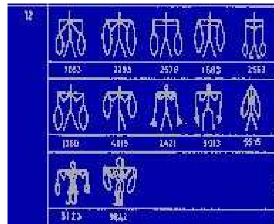
that the Bharatiya languages constitute the
that the writing system consisted of hieroglyphs, intended to record property transactions of artisans -- smiths in particular. [cf. Seal impression from Ur showing a water-carrier and an enclosure of two brackets: ()]



This crucial evidence of the continuum of Sarasvati culture in India enables linking Sarasvati writing system -- mlecchita vikalpa with Sarasvati lingua franca -- mleccha.

kut.i = a woman water-carrier (Te.) rebus: **kut.hi** 'a smelter for smelting iron ore' (Santali)

The ur seal impression of the "water-carrier" glyph is the foundation glyph for the following signs and variants, starting with Sign 12:



V012 V014 V015

A simple step is attempted and presented, based on the orthographic-semantic framework provided by the Indian Lexicon (a comparative dictionary of over 25 ancient languages of India), that the inscriptions are composed of hieroglyphs which can be read rebus. (The word hieroglyph was coined in 1598 from hieroglyphic > Middle French hieroglyphique < Latin hieroglyphicus < Ancient Greek ἱερογλυφικός (*hieroglupһikos*) < ἱερογλυφέω (*hieroglupheō*, "to represent hieroglyphically") < ἱερός (*hieros*, "sacred, holy") + γλύφω (*gluphō*, "to carve, to engrave, to cut out". Source: http://en.wiktionary.org/wiki/hieroglyph) It is appropriate to render many glyphs of the civilization, as *hieros*, 'sacred', consistent with Indian tradition following Gr.tsamada rishi of Rigveda – mantra dras.t.aa -- who has seen Sarasvati in three forms: river, mother, divinity – Vaakdevi Sarasvati who nurtured, in over 80% of archaeological sites, on the banks of River Sarasvati.

Hieroglyphs are pictograms used to represent phonograms (of syllabic sounds or word sounds). Hieroglyphs use pictorial symbols to connote, as rebus, individual sounds of the spoken language. The word, 'rebus' is an ablative plural of *res* 'thing' and means 'of or by things' derived from the phrase: *nōn verbīs sed rébus*" meaning "not by words but by things". An example illustrates the rebus principle. The sounds

in the sentence, “I can see you” can be written down by using the pictographs of “eye - can – sea – ewe”. (Example taken from http://en.wikipedia.org/wiki/Rebus)

The pictorials in inscriptions on a variety of media – terracotta bangles, paintings on jars, incisions on copper plates, tablets, seals, stone tools, metallic weapons -- unearthed in archaeological excavations (and taken from the exquisite corpuses of Mahadevan and Parpola) are tagged to the morphemes of the languages of Bharat. A morpheme, in language studies of internal structure of words, is the smallest abstract unit, with semantic meaning, that roughly corresponds to a set of words that are different forms of the same word. (For example, the word ‘talk’ has different forms such as talk, talks, talked, and talking.)

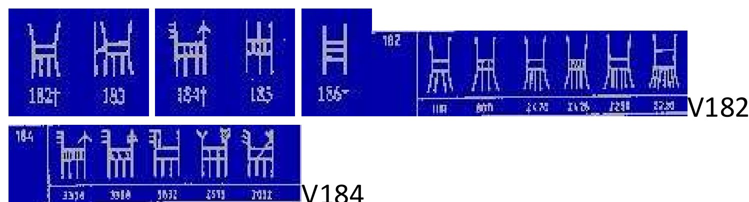
Using the rebus principle, homonyms with substantive meanings are identified: such as the tools of jeweller-smithy, turner, miner, smith, metals-trader, mint. (A **homonym** is one of a group of words that share the same spelling and the same pronunciation but have different meanings.)

Two categories of lexemes are collated:

words which are adaptable for hieroglyphic representation ('image' words);
words related to the artefacts of the bronze-age civilization ('tool or product' words). [A word links tightly together, one or more morphemes and is a unit of language which carries meaning.]

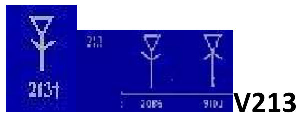
Many inscribed objects have recurrent glyphs. [A glyph is the shape given to a particular illustrated symbol. Hence, a glyph can have many variant orthographic representations as identified in Mahadevan and Parpola corpuses and concordance lists of the Sarasvati writing system – the so-called Indus script.]

The Sign list used, in a perspective snapshot presents a number of variants and ligatures which reinforce the hieroglyphic nature of orthography and a unique use of ligatured glyphs.


V182

V184

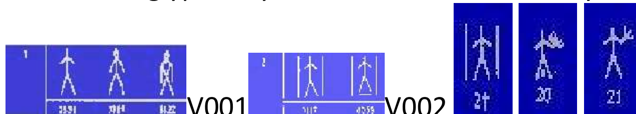
These are examples of ‘signs’ which are derived from the ‘antelope’ glyph. It is notable that Sign 182 occurs repeatedly on copper plate epigraphs. The first variant on the left of variants of Sign 184 demonstrates this. The ligature of a tail is characteristic both on this sign variant and on pictorial motifs which depict an ‘antelope’

**V213**

Sign 213 could be derived from the pictorial motif of 'standard device' normally shown in front of a one-horned heifer. sangad.a 'gimlet'; Rebus: sangad.a 'portable furnace'



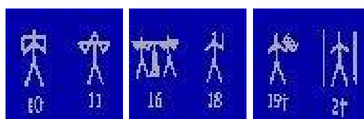
Sign 51 may be identified as a 'bandicoot, rat' seen from the back as shown on the variant on fifth from left.
kod.el 'rat' glyph may be rebus for kol.el 'smithy': kole.l.



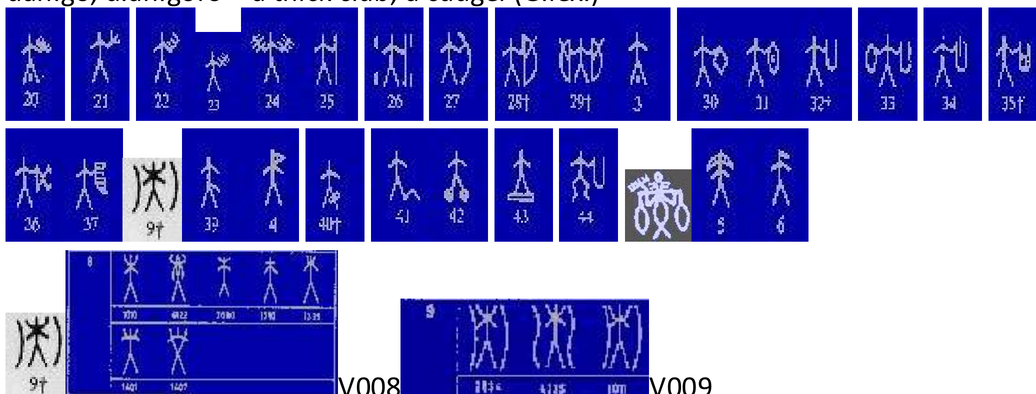
V001 V002 As Signs 20 and 21 demonstrate, the 'body' glyph gets ligatured with other glyphs which occur independently as hieroglyphs. Such ligatured glyphs have to be read by isolating and identifying the ligaturing elements and reading each element rebus.

and.ren (pl. and.ran) male, man (Pe.); and.ra a male animal or bird, male (Kui); an.d.ra_ male (said only of animals)(Kur.); an.d.ya_ fierce, unmanageable (of bulls, bullocks, and male buffaloes)(Kur.); an.d.ya a bull (Malt.); an.d.i_ra male (Skt.); an.d.ira_ id. (Or.)(CDIAL 1111; DEDR App. 7). Rebus: aduru 'native metal'.

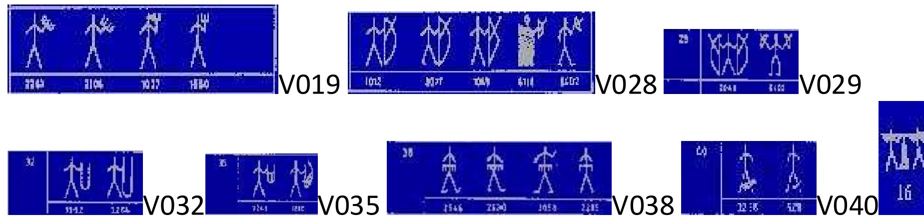
Glyph is: *me~_d, me_d* 'body' (Kur.); *meth* body (Malt)(DEDR 5099). Sign 1 occurs 131 times on epigraphs. Rebus: med. 'iron' (Mundari).



dan:go, d.an:goro = a thick club; a cudgel (G.lex.)



V008 V009


V019 V028 V029 V032 V035 V038 V040

bhat.a ‘warrior’ **bhat.a** = a warrior (G.lex.) bhad.a a warrior; a hero; adj. Strong, mighty; opulent; an opulent person (G.lex.) **bhar.** = soldier (B.); warrior (G.); hero, brave man (Ku.); bhat.a = hired soldier (MBh.) pat.ai = army, weapons, battle (Ta.); pat.a = battle, army (Ma); pad.eyila = soldier (Ka.); pad.eval.a = a general (Ka.); pad.ava = fight, battle; pad.avalamu = van of an army; pad.ava_lu = commander of an army (Te.)
batur.i = a young bull; batur.iko hukarea = young bulls low (Mundari.lex.) cf. bat.u = boy (esp. a young Brahman), term applied contemptuously to an adult (MBh.); bar.u a Brahman title (B.); servant (Or.); bar.ua_ Brahman boy, pupil (H.); bad.u_u (OG.)(CDIAL 9121). bhat.t.o = a contemptuous term for a bra_hman.a; bhat.a, bhat.t.a = a title affixed to the names of learned bra_hman.as; a learned man (G.lex.)



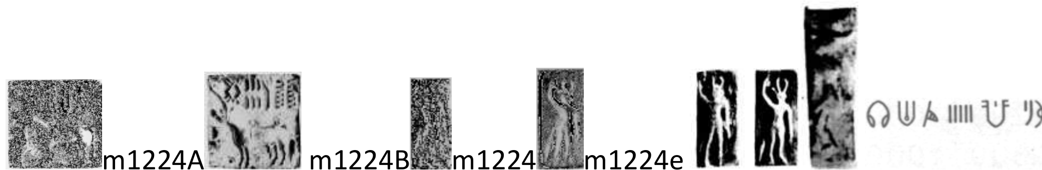
m1653 ivory plaque 1905 bha_tha_ quiver (OAw.H.); bha_tho, bha_to, bha_thr.o quiver (G.); bha_ta_ quiver (M.); bha_tad. id. (M.); bathi_ quiver (S.)(CDIAL 9424). Basket: vat.t.i basket made of palm-stem fibre; (ve_t.t.uvan- ma_n-r-acai corinta vat.t.iyum : Purana_. 33); round basket of grass, straw, leather or palm-leaves (Ma.); vat.t.ikai basket (Ta.); bat.t.i basket (Kod..); rattan basket (Tu.); vat.t.il quiver for arrows, basket, measure of capacity (Ta.)(DEDR 5231). Rebus: bhat.a ‘furnace’ (G.)


V017 m1198 1482 Sign 7

Homographs exist for the zebu glyph. Homographs are: a ‘man’, an attack, harrow, splinter.

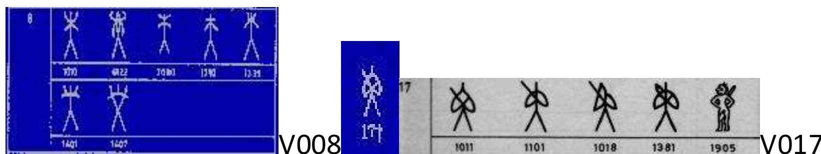

h684 4632 [The last two signs of Text 4632 occur on 93 epigraphs]


A variant of Sign 8 is a horned, standing person ligatured to the buttocks of a bull. d.hagara_m = pl. the buttocks, hip (G.) Rebus: d.han:gar = blacksmith

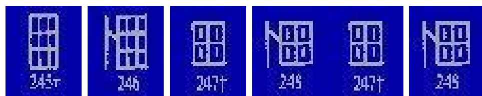

m1224A m1224B m1224 m1224e

4319 Standing person with horns and bovine features (hoofed legs and/or tail).
d.hagara_m 'thigh' (G.); rebus: d.han:gar 'blacksmith' (H.)

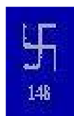
er-aka = upper arm, wing (Te.) [Note the orthographic emphasis on the wing of a bird]. Note the raised arm on m1224 of the horned person standing with buttocks ligatured to the back of a bovine (with tail). Rebus: eraka ‘copper’ (Ka.) kod. ‘horn’; rebus kod. ‘workshop’


V008 V017

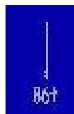
bhat.a = a warrior (G.lex.) bhad.a a warrior; a hero; adj. Strong, mighty; opulent; an opulent person (G.lex.) bhar. = soldier (B.); warrior (G.); hero, brave man (Ku.); bhat.a = hired soldier (MBh.) pat.ai = army, weapons, battle (Ta.); pat.a = battle, army (Ma); pad.eyila = soldier (Ka.); pad.eval.a = a general (Ka.); pad.ava = fight, battle; pad.avalamu = van of an army; pad.ava_lu = commander of an army (Te.) Rebus: bhat.a ‘furnace’ (G.)



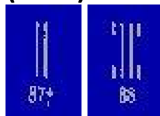
bata = lattice work, inter-lacing (Santali.lex.) Rebus: bhat.a ‘furnace’ (G.)



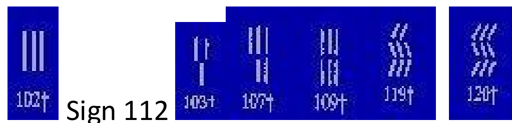
satthika ‘svastika glyph’ (P.); rebus: jasta ‘zinc’ (H.)



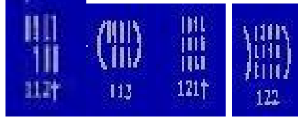
kod.a = in arithmetic, one (Santali) got. = one (Santali) got.a = numerative particle (Mth.) kod. = place where artisan’s work (Kur.)

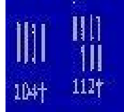
 **barea ‘two’; rebus: bar.ea ‘merchant’**

 **kolom ‘three’ (Austro-asiatic) Rebus: *Ka.* kolime, kolume, kulame, kulime, kulume, kulme fire- pit, furnace; (Bell.; U.P.U.)**

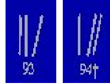

Sign 112

kolmo ‘three’; rebus: kolmo ‘rice-plant’


Glyphs composed of four and three short linear strokes: pon, ponea, ponon = four (Santali) Rebus: pon ‘gold’ (Ta.)



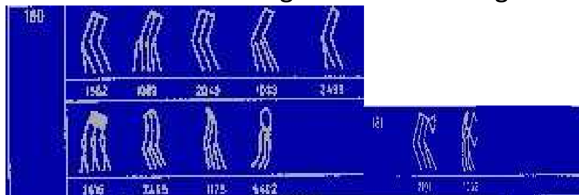
pon, ponea, ponon = four (Santali) pon-, por- = metal, gold, luster, beauty (Ta.); pol = gold (Ma.) kolom ‘three’ (Austro-asiatic) Rebus: *Ka.* kolime, kolume, kulame, kulime, kulume, kulme fire- pit, furnace; (Bell.; U.P.U.)


gan.d.e ‘to place at a right angle to something else, cross, transverse’; *gan.d. gan.d.* ‘across, at right angles, transversely’ (Santali) [Note: A slanted line Lahn.d.a writing of accounts connotes a quarter; a straight line connotes ‘one’.] Rebus: kand. ‘furnace, altar’ (Santali)

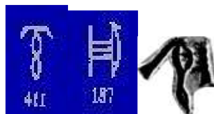


kolmo ‘rice plant’; rebus: kolami ‘furnace’; ad.aren ‘lid’; rebus: aduru ‘native metal’

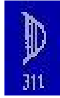

Sign 180 Signs 180, 181 have variants.



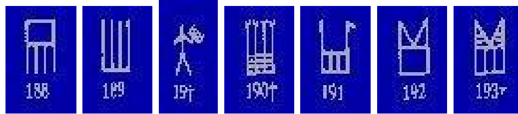
Edging, trimming (cf. orthography of glyph in the middle of the epigraph)
kor.i = pegs in the ground in two rooms on which the thread is passed back and forth in preparing the warp (S.) ***got.*** Hem of garment (H.) kod. ‘artisan’s workshop’ (Kur.)

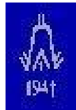


sa_ngi ‘squirrel’ , ‘ladder’ (P.) **tsa_ni, tsa_nye** = squirrel (Kon.lex.) [Alternatives: tor. = squirrel; sega = squirrel; sisiar.in: = squirrel (Santali.lex.) Rebus: tor.a = a bag for holding money carried bound round the waist underneath the clothing, a long narrow purse; sisiar.i = thin, slim, as a stick (Santali)] **canil, can.il** (Tu.), an.n.al (Ma.), an.n.a_n (Ma.), an.il, an.ilam (Ta.)[Tol. po. 561] sanja_b = the grey squirrel (U.Pers.)



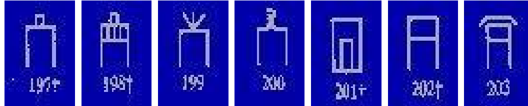
A harp **san.i_** (P.) Rebus: **sanil** (Tu.); sa_n.a_, s'a_n.a (M.), saniyamu (Te.) = a bayonet or short dagger; [san.gi_n, s'ani_n = bayonet; hard, solid (P.); san:gin = bayonet (Santali)] san:gin = steel dagger at the end of a gun (G.), can-iyan- = bayonet, kuttuva_l. (Ta.) **san.g** = a stone; aki_k or carnelian stone (P.) a chisel for cutting metals

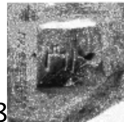


 gat.a = a small stream or water course (Santali) gat.t.i ban:ga_ru = gold in ingots or bars (Te.)

V132, Signs 132, 133

Konḍa (BB) **kaṟna** canal. ***Kuwi*** (Su.) karna irrigation channel (DEDR 1938) **kárṇa—** m. 'ear, handle of a vessel' RV; kankha 'rim of vessel' (Santali) Rebus: kan- 'copper' (Ta.)



m0318m0318B

2626

The long linear stroke on m0318 can be :

kod.a, kor.a = in arithmetic one; 4 kor.a or kod.a = 1 gan.d.a = 4 (Santali.lex.) Rebus, substantive: **kod.,** 'artisan's workshop'

If **kod.a** is a determinative of Sign 197 including on the seal m0318, the sign may also be read as: **kod.a But, given the dominant position it occupies and duplication of the sign sequence on the same seal m0318, Sign 197 may have to read as a substantive indicator of an architectural unit, something like a gateway of Dholavira for entry into a smithy or mint.**



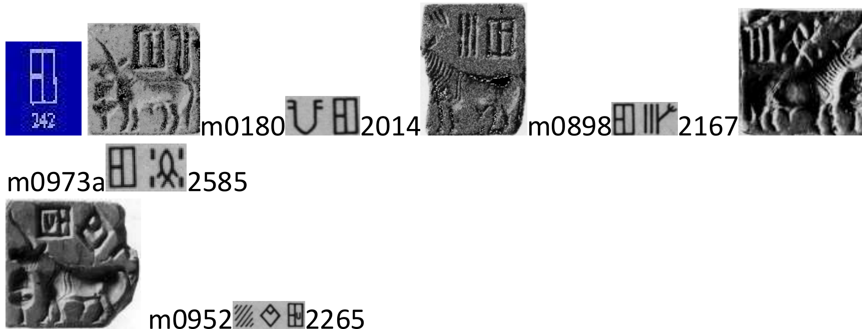
Glyph: dat.t.ha_ = large tooth, fang, tusk (Pali); dam.t.ha_ fang (Pkt.); da_t.hiru = tusked (S.); da_t.ha_ , da_t.ha large tooth, tusk (Pali); da_r.h = tusk, root of tooth,

bite (of an animal) (L.)(CDIAL 6250). da_t = a tooth; d.at.a = a tooth, the teeth (Santali) Rebus: datu 'mineral' (Santali); dha_tu id. (Skt.)

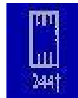


t.an:kamu = the top or side of a hill (Te.)

d.agar = little hill (H.) Rebus: **d.ha~gar** 'blacksmith' [The ligature of a 'ficus religiosa' leaf reinforces the nature of the metal work: *loa* 'ficus religiosa'; *loh* 'iron'; thus Sign 232 is a ligature of loh 'ficus' and d.agar 'hill'; Rebus: loh 'iron' + d.ha~gar 'blacksmith'.



m0180 2014 m0898 2167 m0973a 2585 m0952 2265



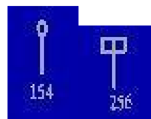
<u>Reservoir used in irrigation</u>: **go~r.a_** reservoir used in irrigation (H.)(CDIAL 3264). **kun.t.am** pool, tank; deep cavity, pit (Ta.Ma.); **kun.t.u** depth (**Man.i. 8,8**); id. (Ma.); **kun.t.u-ni_r** sea, as being deep (**Na_lat.i, 94**)(Ta.lex.) **kum.d.a**, **kom.d.a** pool (Pkt.); **kun.d.a** basin of water, pit (MBh.); **kunu** whirlpool (S.); **kun.d.** pool (WPah.); **kunnu** cistern for washing clothes in (WPah.); **ku~_d.** tub (H.); **ku~d.** pool, well (M.)(CDIAL 3264). **ku~d.** = basin (G.) **kun.d.a** a basin; a round hole in the ground for receiving water; a pond or well consecrated to a deity (G.) **kun.d.a** [Skt. a basin] **khu~idaha, khu~idak** = a deep pit full of water (Santali)

kun.d.a = a reseroir of water surrounded with steps to go down to the bottom (G.Skt.) (G.lex.) Rebus: **gun.d.amu** fire-pit; (Inscr.) a hollow or pit in the dry bed of a stream (Te.); **gunta** pit, hollow, depression (Te.); **gun.d.i** deep (Kol.); **ghun.d.ik** id. (Nk.); **gut.t.a** pool (Pa.); **kun.t.a** pool (Go.); **gut.a** hollow in the ground, pit (Kond.a); **kut.t.** a large pit (Kui); **gutomi** pit (Kuwi); **kun.d.i** pond (Kuwi); **kun.d.a-** round hole in the ground (for water or sacred fire), pit, well, spring (Skt.); **kut.t.am** depth, pond (Ta.); **kun.t.u** depth, pond, manure-pit (Ta.); **kun.t.am, kun.t.u** what is hollow and deep, pit (Ma.); **kun.d.a, kon.d.a, kun.t.e** pit, pool, pond (Ka.); **kun.d.i** pit; **kun.d.itere** manure-pit (Kod..); **kun.d.a** pit (Tu.); **kon.d.a** pit (Tu.); **kun.t.a, gun.t.a** pond, pit (Te.)(DEDR 1669). **kut.t.ai** pool, small pond (Ta.)(DEDR 1669). [cf. cognate etyma connoting secrecy (treasure): **gun.pu, gumbu** profundity, solemnity, secrecy, depth (Ka.); **gumpu** secret, concealed (Tu.)(DEDR 1669).] **xon.d.xa_, xo~_r.xa_** deep; a pit, abyss (Kur.); **qond.e** deep, low lands (Malt.)(DEDR 2082). **khutt** depression in

earth or wall, hollow eyes (P.); **khutti_** hole in the ground in a game with cowries (P.)(CDIAL 13655). **kud.e** a rat's hole (Tu.); **kod.e** to hollow, excavate (Ka.); **kud.ute** palm of the hand, esp. hollowed or held as a cup (Ka.)(DEDR 1660).


Signs 249, 250 m0925 1292

The circumgraph of four short linear strokes has been interpreted as **kod.a** = 4 **gan.d.a**. The glyph on Sign 249 can thus be a product made in or a mineral processed in a **kod.,** 'artisan's workshop'. That this may connote a mineral is also reinforced by the appearance of this glyph on two tin ingots found at Haifa. Could this Sign 249 connote, 'tin'? Yes, ranku 'liquid measure'; rebus: ranku 'tin' (Santali)



<u>Needle, probe, bodkin; arrow</u>: **xala_** pin (of bamboo, wood, or iron)(A.); **sala_i_** pin (in spinning yarn)(L.); **sal.a_i_** needle in shuttle, spindle (P.); needle, probe, bodkin (H.); coarse needle, short stick (Bi.); **sara_i** iron or wooden poker (Mth.); **sal.a_, sal.ai_, sal.i_** pin, spike, skewer (M.)(CDIAL 12349). **salay** spike (K.); **s'ala_ka_** arrow (Pali)(CDIAL 12349). Rebus: s'a_la 'workshop' (Skt.)

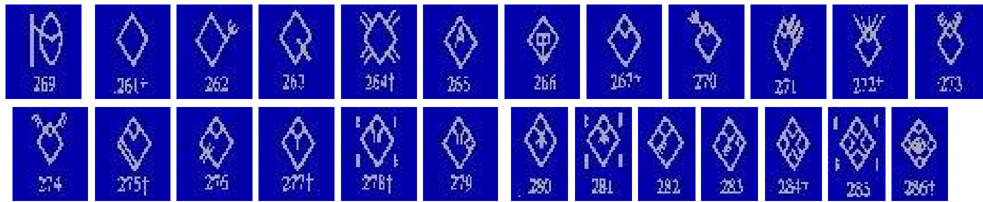
Substantive: **d.ha_l.ako** = a large metal ingot; d.ha_l.aki_ = a metal heated and poured into a mould; a solid piece of metal; an ingot (G.) d.ha_l.avum = to fuse; to melt; to cast (a metal)(G.) *dul* 'to cast metal in a mould' (Santali) *d.ha_l.u* cast, mould; way, style (Ka.); d.ha_l.a (M.); d.a_l.a lustre, radiance; beauty, loveliness, gracefulness (Ka.); d.ha_l.a (M.); d.a_lu, d.a_l.u, da_l.u (Te.)(Ka.lex.) d.ha_lan. to melt, to mould, to form, to figure, to shape, to coin; d.hala_i_, d.hala_un. the price of casting, pouring, melting; d.halna_, d.halja_n.a_ to be cast, to be poured out (as wine into a cup); d.halwa_i_ pouring out, melting; the price of pouring out, melting out (P.lex.)

Glyph: **d.a_l., d.a_l.i_, d.a_l.um** [Dh.Des. d.a_l, d.a_li_ = Hem. Des. d.a_li_ = Skt. s'a_kha_ a branch of a tree] a branch of a tree (G.)

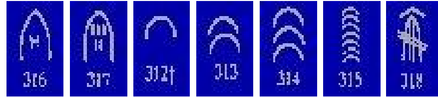
Glyph: d.ha_l.iyum = adj. sloping, incliding; d.ha_l. = a slope; the inclination of a plane (G.)

Glyph: d.ha_l.iyo = a water-course, an aqueduct (G.)

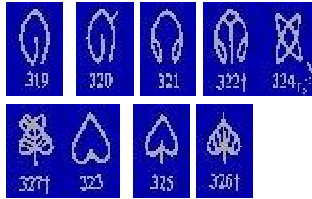
Glyph: *dol* 'the shaft of an arrow, an arrow' (Santali)



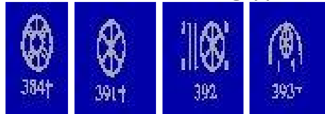
kana kona = orner (Santali) kan- copper work, copper (Ta.) Rebus: kancu ‘bronze’ (Te.)



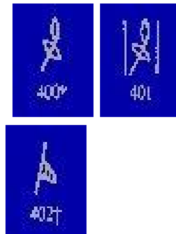
gummat.a cupola, dome (Ka.) kumpat.i = chafing dish (Te.) gad.d.a proyyi = a fireplace or hearth with 3 or 4 inverted hemispherical clods placed on it (Te.)



kamar.kom ‘ficus’ glyph may be remus for ‘mint’: kampat.t.am



era, erako ‘nave of wheel’; erako_lu the iron axle of a carriage (Ka.) eraka, er-aka any metal infusion (Ka.Tu.)

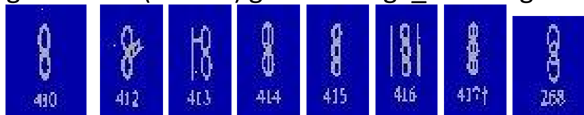


ko_d.i = a kind of flag, an image of garud.a, basava, or other demi-god set upon a long post before a temple; cf. gud.i, temple (Ka.lex.) kod. = place where artisan’s work (Kur.)

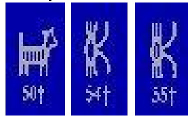


banga_d.i’’bangle’ Two-wheeled cart: **bahal, bahali_, baheli_** two-wheeled cart (Bi.); bahal id. (H.); bahli_ two-wheeled cart drawn by two oxen (H.); bahaila cart (OMarw.); vhel, vel bullock-cart (G.); vahala accustomed to the yoke (S'Br.)(CDIAL 11458). Rebus: **ban:gala** = kumpat.i = an:ga_ra s’akat.i_ = a chafing dish, a portable stove, a goldsmith’s portable furnace (Te.lex.)

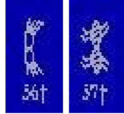
gad.i ‘cart’ (Santali) gat.t.i-ban:ga_ramu = gold ingot (Te.)



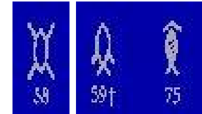
kad.i_ a chain; a hook; a link (G.); **kad.um** a bracelet, a ring (G.); Rebus: **ka_t.i** = fireplace in the form of a long ditch (Ta.Skt.Vedic)



Spider kan:gara_ (Tir.) gan:ges. (Ash.) kan:gar 'portable furnace (K.) kan:g portable brazier (B.)



kolhe = a species of small black ant (Santali.lex.) Rebus: kol 'panchaloha (alloy of 5 metals)(Ta.)

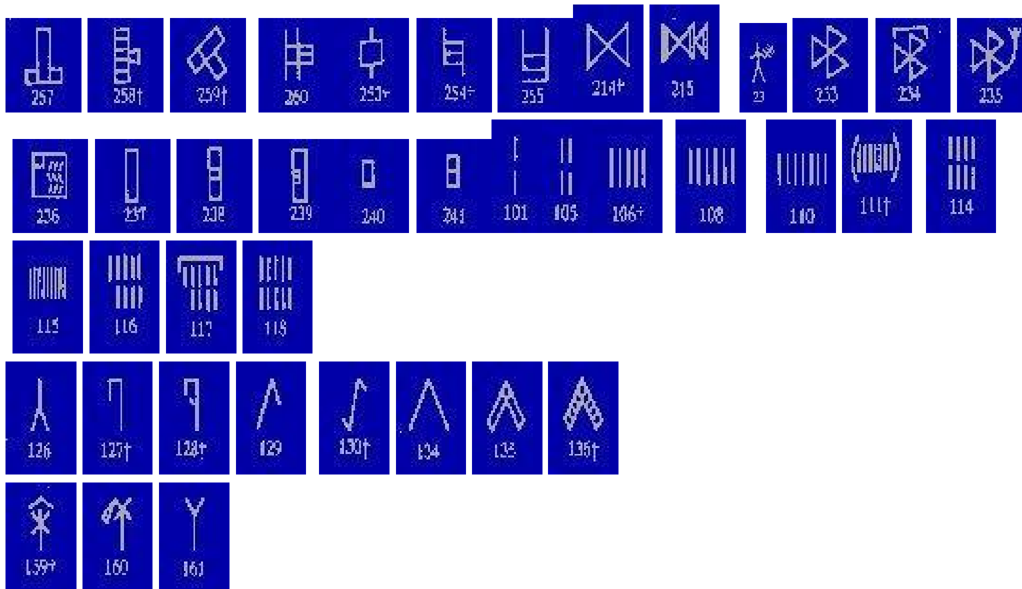


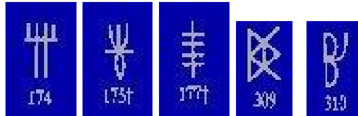
bed.a hako 'fish' (Santali) Rebus: bed.a 'either of the sides of a hearth' (G.) [Early form of hako is 'ayo'; rebus: ayas 'metal']

kolli = a fish (Ma.); koleji id. (Tu.)(DEDR 2139). ko_la_ flying fish, exocaetus, garfish, belone (Ta.) ko_la_n, ko_li needle-fish (Ma.)(DEDR 2241).

Vikalpa: ko_li = a stubble of jo_l.a (Ka.) ko_le a stub or stumpof corn (Te.)(DEDR 2242).

The following glyphs are difficult to decode orthographically and hence, difficult to tag with corresponding lexemes. However, they may be interpreted in context with reference to comparable glyptic representations in the corpus:





Method to decode sets or categories of inscribed objects

Linguistic area of Sarasvati Civilization

A major challenge in establishing the continuity of the Bha_rati_ya civilization beyond ca. 1300 BCE is the as yet unresolved problem of decoding inscriptions of the Sarasvati-Sindhu civilization (or, the so-called decipherment of Indus Script).

Justification for the use of rebus method

Through a number of monographs, superb structural analyses of the inscriptions have been done by both Parpola and Mahadevan. The analyses point to the use of most of the Signs as representing 'nouns' or '*res*, things'.

The use of the rebus method is justified on the following evidence and analysis:

The pictographs to which 'sound-bites' are tagged, as keys to the process of decoding the inscriptions, cover a wide range and number of inscribed objects as shown by the following frequencies (out of 13,372 occurrences of Signs and over 100 pictorial motifs (the frequencies are only indicative numbers, hence, approximate and are subject to change as the orthography of many pictographs and Signs get more precisely identified).

Hieroglyphs and frequencies of occurrence on epigraphs

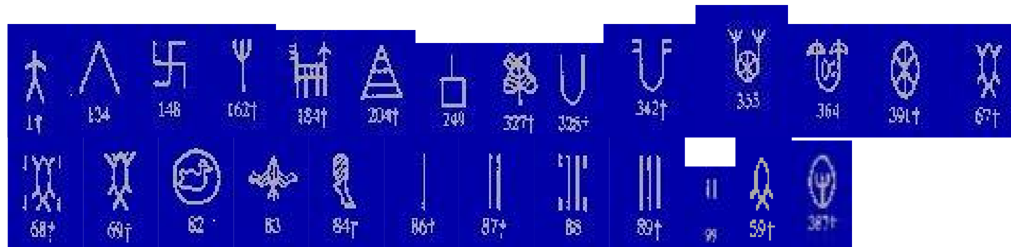
One-horned heifer with a pannier	1159 + 5 (with two horns)
Shor-horned bull	95 +2 (in opposition)
Zebu or Bra_hman.i bull	54
Buffalo	14
Elephant	55 + 1 (horned)
Tiger (including tiger looking back)	16 + 5 (horned)
Boar	39 + 1 (in opposition)
Goat-antelope	36 + 1 (flanking a tree)
Ox-antelope	26
Hare	10 +1 (object shaped like hare)
Ligatured animal	41
Alligator	49
Fish	14 (objects shaped like fish); fish also a Sign
Frog	1
Serpent	10
Tree	

	34 + 1 (leaves); leaf is also a Sign **kut.i ‘tree’; rebus: kut.hi ‘smelter furnace’**
Dotted circle	67 **ghan:ghar ghon:ghor** ‘full of holes’ (Santali); rebus: **kan:gar** ‘portable furnace (K.)
Svastika	23 rebus: **satthiya_** ‘dagger, knife’ (Pkt.) **satva** 'zinc' (Ka.)
Endless-knot	4
Double-axe	14 (inscribed objects shaped like axe)
Standard device (lathe, portable furnace)	19
Rimmed narrow-necked jar	1395
Fish Signs	1241
Leaf Signs	100
Nave of spoked wheel	203
Cart frame + wheels	26
Sprout (or, tree stylized)	800
Water-carrier	220
Scorpion	106
Claws (of crab)	130 + 90 (shaped like pincers)
Arrow (spear)	227
Rimless, wide-mouthed pot	350

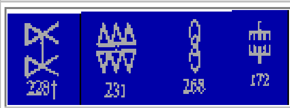
Frequency range	No. of Signs	Total Sign occurrences	Percentage	Cumulative percentags
1000 or more	1	1395	10.43	10.43
999-500	1	649	4.85	15.28
499-100	31	6344	47.44	62.72
99-50	34	2381	17.81	80.53
49-10	86	1833	13.71	94.24
9-2	152	658	4.92	99.16
Only once	112	112	.84	100.00

Only 67 Signs account for a total of 80.53 percent of all occurrences of Signs on inscribed objects.[After Mahadevan 1977: 17].

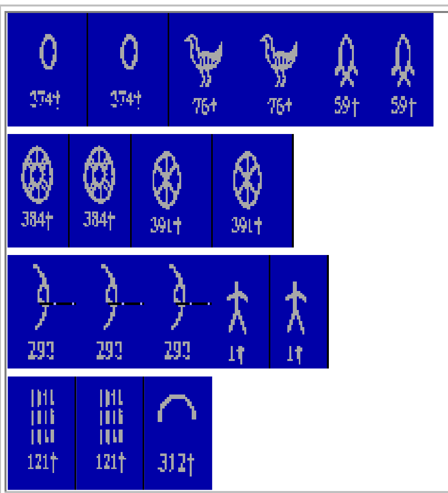
Some examples from Hieroglyph Sign List showing the glyptic nature of writing: (After Mahadevan)



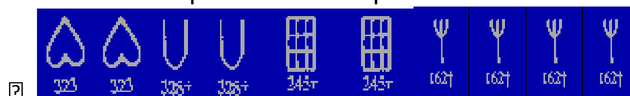
Mirror-reflected pairs of graphemes



Mahadevan notes, "Compounds of mirror-reflected pairs. A rather curious feature of the script is the occurrence of mirror-reflected pairs as bound Signs." (Mahadevan, 1977, p. 16) He adds that the mirror-reflected pairs may have the Sign doubled on the horizontal or vertical axis.

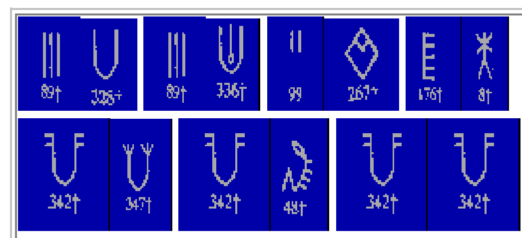


There are also paired or re-duplicated occurrences of Signs.

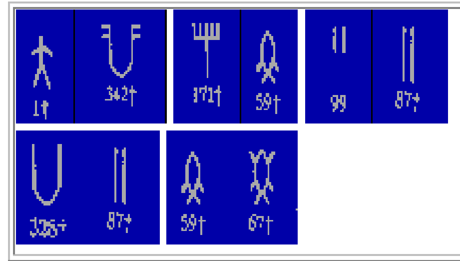


There are some stable sequences of Signs in inscriptions, stability being measured by the frequency of occurrence of two Signs within each inscription.

The following seven pairs have between 93 and 291 occurrences in the inscriptions.

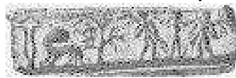


There are five pairs with between 65 and 87 occurrences in the inscriptions.



There are many ligatured Signs:

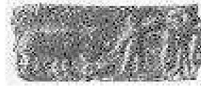
An inverted ‘v’ (symbol of ‘lid’) is ligatured on Signs 65, 66, 75 (fishes), Sign 163 (corn sheaf), Sign 138 (cross-road), Sign 334 (pot). This inverted ‘v’ is also ligatured on a jar pictorial – like a lid on the rim of the narrow-necked jar. (Fig. 111 field symbol, Mahadevan corpus).

FS111

The 'jar' Sign is also ligatured (infixed) with short linear strokes.

Ligatured Signs appear together with pictorials in inscriptions.

Thus, Fig. 97 Mahadevan.

 This composition is a combination of three pictorials – bull, trough, standing person with upraised arm -- and the Sign: 

The person standing in the middle seems to point with one hand at this Sign and at the 'trough' with the other hand, seemingly conveying both 'trough' and the ligatured Sign 15 which is a composition of the 'jar' and 'the water-carrier' representions.

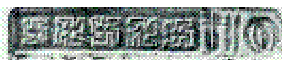
A characteristic feature of the use of graphemes in the inscriptions is ‘ligaturing’.

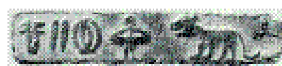
		The ligaturing pattern is extended further in Sign 418: Sign 15 is further ligatured with a harrow (Sign 171) and oval (Sign 374).
		Sign 352, jar + corn sheaf (On Sign 352 the rim of jar is represented by = and also corn sheaf glyph.)

394†	374† 342†	Sign 394, jar and oval
353	342† 328†	Sign 353, rim of jar and wide-mouthed, rimless pot
15†	342† 12†	Sign 15 itself seems to be a ligature of Signs 12 and 342
45 46	328†	Signs 45/46 (seated person) seem to ligature the pictorial of a kneeling-adorant with Sign 328
355	391† 347†	Sign 355 seems to ligature Sign 347 and Sign 391
232	326† 230†	Sign 232 seems to be a ligature of Sign 230 and Sign 326
243	328† 242	Sign 243 seems to ligature Sign 242 and Sign 328
286†	267† 391†	Sign 286 seems to ligature Sign 267 and Sign 391
19†	1† 171†	Sign 19 seems to ligature Sign 1 and Sign 171
218	217† 328†	Sign 218 seems to ligature Sign 217 and Sign 328
32†	328† 1†	Sign 32 seems to ligature Sign 1 and Sign 328

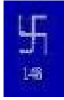
		Sign 372 is a three-fold ligature with Signs 397 and 162
		Sign 387, corn sheaf within an oval Ligature of Sign 162 and Sign 373 yields Sign 387.
		Signs 63 and 64, bird and fish
		Sign 36, man and pincers
		Sign 90, three linear strokes and corn sheaf
		Sign 362, oval and comb
		Sign 383 ligatures Signs 374, 373 and 176
		Sign 19, man and harrow
		Sign 21, man and corn sheaf
		Sign 348 ligatures with Sign 162 and a pair of 172 (See paring in Sign 173)
		Sign 173 is a ligatured representation of a pair of the Sign 172.

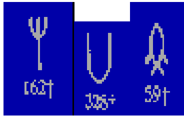
Tablet in bas-relief





H182

On this tablet the repetition of the 'svastika' Sign sequence five times points the possibility of the'svastika' Sign denoting an 'object or thing.'

Each of the Signs (162, 325 and 59) seems to denote an ‘object’, and is frequently preceded by ‘numerical strokes’.

Sign 372 (‘oval’ grapheme) ligatures with Sign 162, yielding Sign 387 

The frequencies in parenthesis are based on Mahadevan conordance (which excludes objects that do not contain a 'Sign'); the actual numbers will be higher based on the more comprehensive Parpola photo corpus which includes inscriptions containing only pictorials.

Media types with inscriptions

Seals (1814)
Tablets (in bas-relief or inscribed) (511)*[including Seal Impressions]
Miniature tablets (of stone, terracotta or faience) (272)
Copper tablets (plates) (135)
Bronze implements/weapons (11)
Seal Impressions*

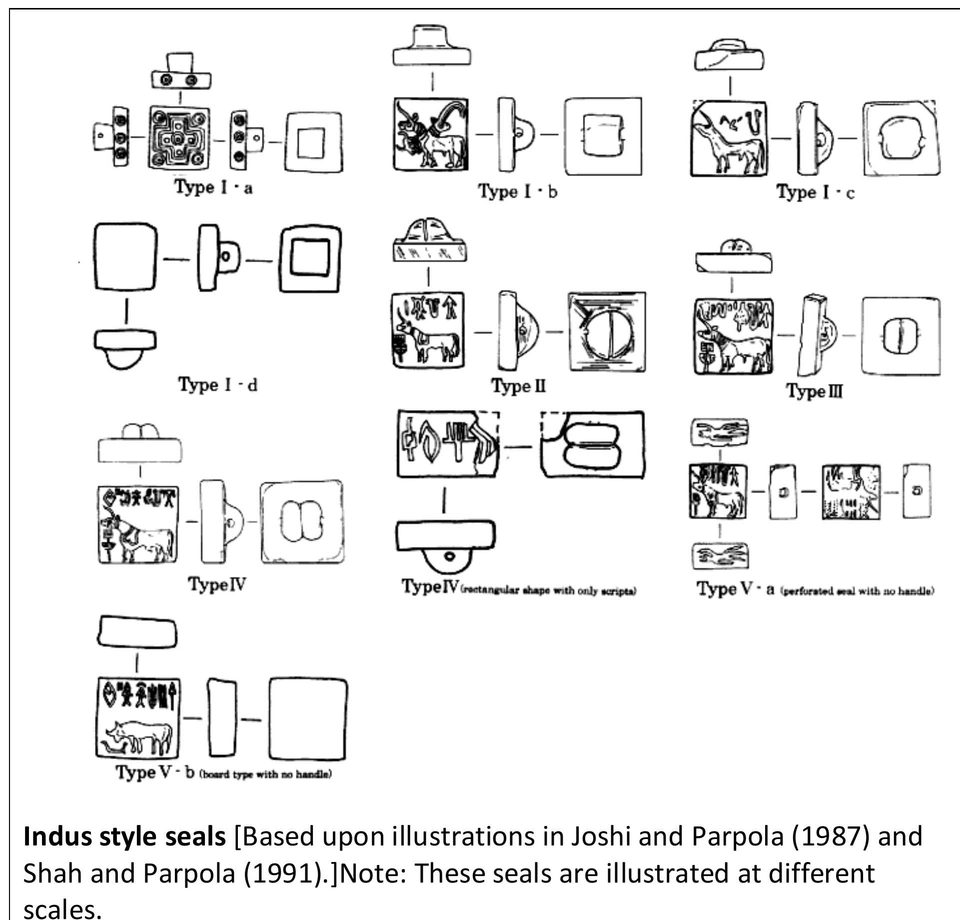


Pottery graffitii (119)
Ivory or bone rods (29)
Inscribed on stone, bracelets (or, bangles), Ivory plaque, Ivory dice, Carnelian tablet, Terracotta ball, Brick (15)
Display-board (Dholavira or Kotda with 10 Signs, possibly atop a gateway) (1)



Stone celt (Sembiyan Kandiyur) (1)

Almost all the miniature tablets are from Harappa; almost all copper tablets are from Mohenjodaro. An inference is that the miniature tablets served the same function as the copper tablets which evidence repetitive messages or Sign sequences.



Indus style seals [Based upon illustrations in Joshi and Parpola (1987) and Shah and Parpola (1991).]Note: These seals are illustrated at different scales.

http://bosei.cc.u-tokai.ac.jp/~indus/english/thesis01e-fg01.html

Considering that the epigraphs of Sarasvati Civilization are dated between 3300 BCE (the early potsherd with writing found at Harappa) to 1400 BCE (the 'jar' seal found at Daimabad), the remarkable stability of the writing system in a vast area is concordant with the remarkable stability of the dialects which can be traced in a continuum from the substratum languages evidenced in lexemes of Bharatiya languages such as Nahali, Gujarati, Kannada, Telugu. Masao Noguchi of Tokai University, Japan has provided a typological analysis of the handles of square seals mostly from Harappa and Mohenjodaro to unravel a chronological sequence. He echoes the views of Bisht who notes that Type Ib seals with no 'signs' but only

‘mythological scene, an animal, or a structure motif’ have been found in layers pre-dating the Sarasvati Civilization in the excavations at Dholavira. He also notes a westward spread of the cultural styles evidenced by the seals and adds that “some Central Asian cultural elements spread westward from Baluchistan, and one of these elements appeared in the "Central Asian style" seal (Gotoh 1999) in the western area of the Indus plain during the Mehrgarh VII period.” http://bosei.cc.u-tokai.ac.jp/~indus/english/thesis01e.html (March, 2003).

The epigraphs point to a westward movement of Bharatiya into BMAC region apart from trade contacts across the Persian Gulf with the Mesopotamian region.

The archaeological evidence, which has a bearing on the search for language(s) of the civilization, is summed up succinctly by Kenoyer: "The origins of the Indus urban society can be traced to the socio-economic interaction systems and settlement patterns of the indigenous village cultures of the alluvial plain and piedmont. More importantly, the factors leading to this transformation appear to be autochthonous and not derived from direct stimulus or diffusion from West or Central Asia." (Kenoyer, J.M., 1991, Urban process in the Indus traditon. A preliminary model from Harappa, in: Richard H. Meadow ed., *Harappan excavations 1986-1990*, Madison, Wisconsin: Prehistory, p. 11).

Sites where evidences of Sarasvati writing system were found:
The site names and abbreviations used:

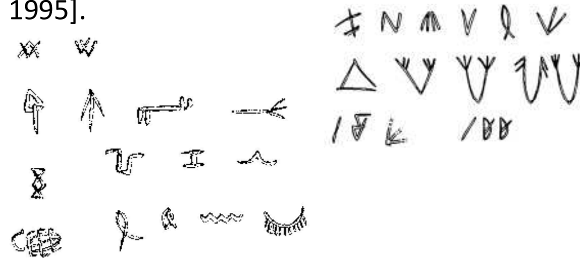
<table>
<tr>
<td>Major sites
M Mohenjodaro
H Harappa
L Lothal
K Kalibangan
C Chanhujo-daro
B Banawali
Rhd Rahman-dheri
Pk Pirak

Minor sites
Agr Alamgirpur
Amri Amri
Ch Chandigarh
Dmd Daimabad
Dlp Desalpur
Dlv Dholavira (Kotadi, Kotda-</td>
<td>
Jk Jhukar
Krs Khirsara (Khera-shara, Netra)
Lh Lohumjo-daro
Msk Maski
Mehi Mehi
Pbm Pabumath
Pbs Prabhas Patan (Somnath)
Rgr Rakhigarhi
Rgp Rangpur
Rhr Rohirah
Rjd Rojdi
Rpr Rupar (Ropar)
Sht Shahi-tump
Sktd Surkotada
Tkwd Tarkhanewala-dera</td>
<td>
Ad Allahdino (Nel Bazaar)
Ai Amri
Blk Bala-kot
Grb Gharo Bhiro (Nuhato)
G Gumla
Hd Hissam-dheri
Kl Kalako-deray
Kd Kotdiji
Lwn Lewan-dheri (Dar Dariz)
L III Loenbar III
Mr Mehrgarh
Nwd Naru-Waro-daro
Ns Nausharo
Nd Nindo-wari-damb</td>
<td>
Pg Periano-ghundai
Skh Sarai Khola
Sb Sibri-damb
Trq Tarakai Qila
Ukn ProvenanceUnknown
West Asian sites
Djoka (Umma)
Kish
Susa
Telloh
Ur
Ukn (Prob. from W. Asia)</td>
</tr>
</table>

Timba) Hls Hulas			

Meaningful set of Signs to keep track of goods

Early potters' marks from Rehman Dheri ca. 3500-2600 BCE [After Durrani et al. 1995].



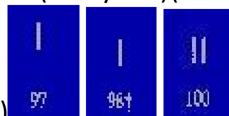
Early script from Harappa, ca. 3300-2600 BCE. [After Fig. 4.3 in JM Kenoyer, 1998].

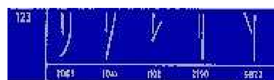
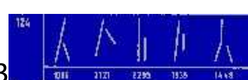
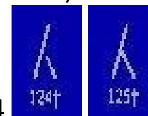
These are early attempts at a writing system to keep track of good bartered in trade. These could also include glyphs to constitute the calling card of the artisans who created this writing system.

A remarkable breakthrough was achieved when it was recognized that some pictorials of, for example, animals such as tiger, buffalo, bull, heifer, zebu can also be used in the writing system using the rebus method: to connote sounds of words related to the artisan's work, similar to the words which denote – graphically -- these animals. So was a writing system born in Sarasvati civilization area.

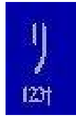
That the glyph denoting the nave of a spoked-wheel occurs with two-short strokes (barea, two) and ligatured with a dome on zebu seals and on inscribed weapon provides a concordance on the general tenor of the message conveyed by the Dholavira Sign-board: the workshop of a turner, kut.ha_ru, armourer, turner who could carve a message into metal.

m298

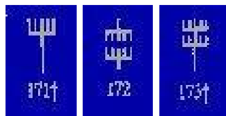
 *at.ar* a splinter; *at.aruka* to burst, crack, slit off, fly open; *at.arcca* splitting, a crack; *at.arttuka* to split, tear off, open (an oyster)(Ma.); *ad.aruni* to crack (Tu.)(DEDR 66) Rebus: aduru 'native metal' (Ka.)  kut.i = a slice, a bit, a small piece (Santali.lex.Bodding) Rebus: kut.hi 'a furnace for smelting iron ore to smelt iron'; *kolheko kut.hieda* koles smelt iron (Santali) at.ar = a splinter (Ma.) aduru 'native metal' (Ka.) badhi 'to ligature, bandage, to splice' (Santali) bad.hi 'worker in iron and wood' (Santali) hak to split (Bahnar); hak to tear; jik to cut (Stieng); gc? axe (Bonda) cf. paku (pakuv-, pakk-) to be split, divided (Ta.) (DEDR 3808). Rebus: hako = axe (Santali) Homograph: hako, bed.a hako a fish (Santali)

V123V124 

badhi = ‘to ligature, to bandage, to splice, to join by successive rolls of a ligature’ (Santali) Rebus: badhi ‘worker in wood and iron’ (Santali) bata_ bamboo slips (Kur.); bate = thin slips of bamboo (Malt.)(DEDR 3917).

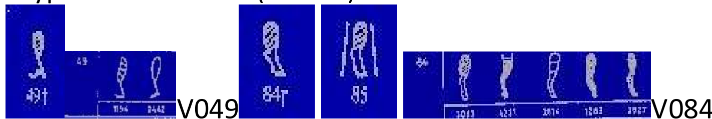


sal = wedge joining the parts of a solid cart wheel (Santali.lex.) sal stake, spike, splinter, thorn, difficulty (H.); sal.i_ small thin stick; sal.iyo bar, rod, pricker (G.); s'ol. reed (Kho.)(CDIAL 12343). salleha, selleha = splinter (Ka.lex.) Rebus: sal ‘workshop’ (Santali); s’a_la id. (Skt.) sa_la = workshop (B.) tat.t.ai = mechanism made of split bamboo for scaring away parrots from grain fields (Ta.); tat.t.e = a thick bamboo or an areca-palm stem, split in two (Ka.)(DEDR 3042). Rebus: tat.t.e = goldsmith (Kod.); tot.xin, tot.xn goldsmith (To.); tat.t.a_n- gold or silver smith (Ta.); goldsmith (Ma .); tat.rava_~d.u = goldsmith or silversmith (Te.); *t.hat.t.haka_ra brassworker (Skt.)(CDIAL 5493).

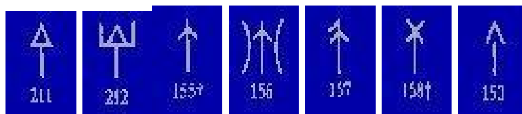


kurappam currycomb (Ta.Ma.); korapa, gorapa id. (Ka.); kurapamu, kor.apamu, gor.apamu id. (Te.)(DEDR 1771). khara_ramu id. (Te.lex.) currycomb a comb consisting of a series of upright serrated ridges, for grooming horses (English)(Doubleday lex.)[cf. curry rub down with a comb and brush XIII cent.; Sp. correar prepare (wool) for use; OF. correier arrange, equip, curry (a horse); curry favel rub down the fallow or chestnut horse, which, for some obscure reason, was taken as a type of perfidy or duplicity; hence curry-comb (ODEE).]

Glyph: khura = hoof (Santali)



Thigh = khura (Ka_tyS'r.), kuracu , kuraccai = horse's hoof (Ta.), kul.ampu = hoof (Ta.) kur_aku (Ma.) ku_t.a = hip (Tu.) kurki = thigh (Go.)

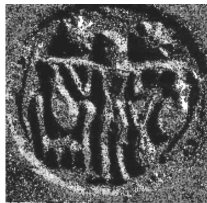


cokho = sharp, keen-edged; coega = sharp, pointed (Santali.lex.) Rebus: jhoka_= one whose business is to feed a furnace or an oven (P.)

khuro (N.) head of a spear; ks.ura (RV.), sharp barb of arrow (R.); khura_ iron nail to fix ploughshare (H.) khura = razor (Pali) co_i, co_ sickle (Wg. < ks.auri_); ks.aura performed with a razor (VarBr.S.); n. shaving (Skt.); ks.auri_ knife (Skt.); c.ho_ra knife (Dm.); c.hor (Kal.)-- khaura razor (Pkt.influenced by Skt.)(CDIAL 3756). kuraga = an instrument of goldsmiths; a sort of anvil (Ka.); khura_rya_ (M)(Ka.lex.) kura =

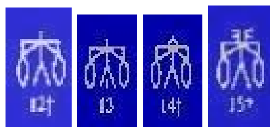
ploughshare (L.); kurelna_ to poke (P.); to dig (H.); kuredna_ to scrape (H.)(CDIAL 3319). [kora-mut.t.u = tool, instrument (Ka.)]

Rebus: khura silver (Nk.); *kuruku* 'whiteness'; *kuru* brilliancy (Ta.); *kuro* silver (Kol.Nk.Go.)(DEDR 1782). koru = bar of metal (Ta.)

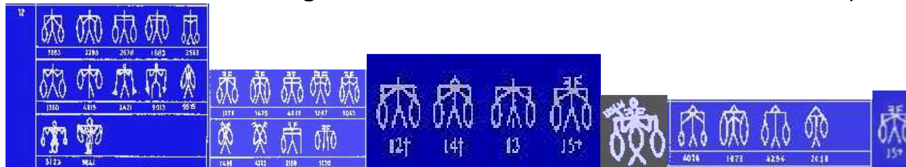


Seal impression, Ur (Upenn; U.16747)); [After Edith Porada, 1971, Remarks on seals found in the Gulf States. *Artibus Asiae* 33 (4): 331-7: pl.9, fig.5]; Parpola, 1994, p. 183; water carrier with a skin (or pot?) hung on each end of the yoke across his shoulders and another one below the crook of his left arm; the vessel on the right end of his yoke is over a receptacle for the water; a star on either side of the head (denoting supernatural?). The two celestial objects depicted on either side of the water-carrier's head can be interpreted as a phonetic determinant: ko_l. 'planet'. The whole object is enclosed by 'parenthesis' marks. The parenthesis is perhaps a way of splitting of the ellipse (Hunter, G.R., *JRAS*, 1932, 476). kut.i = a woman water-carrier (Te.) kut.i = to drink; drinking, beverage (Ta.); drinking, water drunk after meals (Ma.); kud.t- to drink (To.); kud.i to drink; drinking (Ka.); kud.i to drink (Kod.); kud.i right, right hand (Te.); kut.i_ intoxicating liquor (Skt.)(DEDR 1654).Rebus: kut.hi 'a furnace for smelting iron ore to smelt iron'; *kolheko kut.hieda* koles smelt iron (Santali) kaca kupi 'scorpion' (Santali) Rebus kacc = iron (Go.)

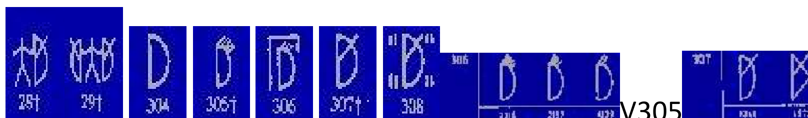
Hunter calls it an unmistakable example of an 'hieroglyphic' seal. enclosure Signs of the field: ( )



Sign 12 (80) is a ligature of kan.d.a kanka 'rim of pot' + kut.i 'water carrier'. Rebus: kan.d.a kanka 'altar for copper' + kut.hi 'metal furnace'. *ke~r.e~ ko~r.e~* an aboriginal tribe who work in brass and bell-metal (Santali)



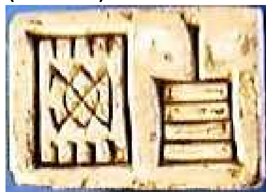
Sign 15 is a ligature of Sign 12 and Sign 342 Thus, Sign 15 can be orthographically read as: kola, kol.i = water-carrier; khan.d.a kanka = rim of a jar. The rebus representation, i.e. homonyms could be: kanaka = gold; kolhe = smelters of iron.]



V305 V307 ka_mat.hum [Skt. kamat.ha a bamboo] a bow (G.lex.) ka_m.t.hi, Glyph: *kamat.ha* bamboo (Skt.) *ka_ca* bhangi pole (Kuwi); *ka_njui_* (pl. *ka_ska*) a banghi (Kuwi); *ka_sa* the shaft of a

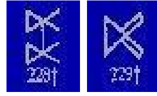
ka_vr.i (Kond.aj. Kui); *ka_nj* carrying yoke (Kond.a); *ka_nju* id. (Kui.Kuwi); *ka_ca, ka*_ja (Skt.); *ka_ca, ka_ja* (Pkt.); *ka_a* a yoke to support burdens (Pkt.); *ka_* pole with ropes hung on each end, used to carry loads on the shoulder (Ta.); *ka_gad.i, ka_vad.i* bamboo lath or pole provided with slings at each end for the conveyance of pitchers (Ka.); *ka_nja_na_, ka_nj* to carry on the shoulders (Go.); *ka_vat.i* pole used for carrying burdens (Ta.); *ka_vu* to carry on the shoulder, bear anything heavy on the arms (Ta.); *ka_vu, ka_vat.i* split bamboo with ropes suspended from each end for carrying burdens (Ma.); *ka_vad.i* id. (Tu.); *ka_vat.i, ka_vad.i* id. (Te.); *ka_vuka, ka_vikka* to carry on a pole (Ma.); *ka_var.i* carrying yoke (Kol.); *ka_vr.i, ka_ver.i, ka_vir.(i); ka_har.i* (Go.); ka_vr.i id. (Mand. Pe.); *ka_vad.a* id. (Pkt.); *ka_vad.ia* one who carries burdens with yoke (Pkt.); *ka_war.* carrying yoke (H.)(CDIAL 3009, 3011, 2760; DEDR 1417).ka_mat.hum [Skt. kamat.ha a bamboo] a bow (G.lex.) kamat.ha = bamboo; kambi = shoot of bamboo; karmuka = bow (Mn.); kamad.ha, kamad.haya = bamboo (Pkt.); ko_ro = bamboo poles (Bhoj.); ka_mro bamboo, lath, pieces of wood (N.); ka_mvari bamboo pole with slings at each end for carrying things (OAw.); ka~_war, ka_war., ka_war., ka_war (H.); ka_var. (G.); ka_vad. (M.); ka_vad.ia, kavva_d.ia one who carries a yoke (Pkt.); ka~_war.i_, ka~_war.iya_ (H.); ka_var.iyo (G.); ka_va_t.hi_ carrying pole (S.); ka_va_t.hyo the man who carries it (S.); ka_mar.a_, ka_mur.a_ rafters of a thatched house (Or.); ka_mr.u~ chip of bamboo; ka_mar.-kot.iyu~ = bamboo hut (G.); ka_m.t.ha_ bow (B.); ka_mt.hu~ (G.); kamt.ha_, kamt.a_ bow of bamboo or horn (M.); ka_mt.hiyo archer (G.); kaba_ri flat piece of bamboo used in smoothing an earthen image (A.); ka~_bi_t., ka~_bat., ka_~bt.i_, ka_mat., ka_mt.i_, ka_mt.hi_, ka_ma_t.hi_ split piece of bamboo etc., lath (M.)(CDIAL 2760). ka_jaha_raka = bearer of a carrying-pole (Pali); ka_ha_ra = carrier of water or other burdens (Pkt.)(CDIAL 3011). ka~d.i, ka~_d.i, ka_d.i (Te.), ka_har.i= carrying yoke (Go.); ka_n~, ka~_j, ka_nj (Ga.) xa_xo_ = triangular frame made by folding a bamboo stem used in pairs for carrying logs (Kur.); ka_nju_ (pl. ka_ska) = a banghi, ka_nju (Pl. ka_ska) carrying yoke (Kuwi) Glyph: (palanquin bearer) *ka_ma_t.i_* [*komat.i_* (M.)] a caste of hindus who are generally palanquin bearers and labourers (G.); *ka_m* work (G.) Substantive: *ka_mat.ha_yo* a learned carpenter or mason, working on scientific principles (G.)
Rebus: kamat.amu, kammat.amu = portable furnace for melting precious metals (Te.) kampat.t.am = mint (Ta.) kammat.i_d.u = a goldsmith, a silversmith (Te.) kampat.t.tam coinage coin (Ta.); *kammat.t.am kammit.t.am* coinage, mint (Ma.); *kammat.a* id.; *kammat.i* a coiner (Ka.)(DEDR 1236)
Ligature on Sign 28: dhanus 'bow' (Skt.) dhan.i_ = the owner, the possessor (G.)

Glyph: kama_t.hiyo = archer; ka_mat.hum = a bow; ka_mad.i_, ka_mad.um = a chip of bamboo (G.) ka_mat.hiyo a bowman; an archer (Skt.lex.)
Rebus: kamat.ha_yo 'a learned carpenter or mason, working on scientific principles' (Santali) kammat.a = mint, gold furnace (Te.)



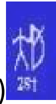
h99-3819 Harvard Harappa Project.







kamat.ha = a crab, a tortoise (G.lex.) kamat.ha = tortoise (Skt.) kamad.ha, kamat.ha, kamad.haka, kamad.haga, kamad.haya tortoise (Pkt.lex.) kamat.hamu = a tortoise; kamat.hi = a female tortoise (Te.lex.)

 (10) Sign 28 (50)

Ligature on Sign 28: dhanus 'bow' (Skt.) dhan.i_ = the owner, the possessor (G.)

Glyph: kama_t.hiyo = archer; ka_mat.hum = a bow; ka_mad.i_, ka_mad.um = a chip of bamboo (G.) ka_mat.hiyo a bowman; an archer (Skt.lex.)
Rebus: kamat.ha_yo 'a learned carpenter or mason, working on scientific principles' (Santali) kammat.a = mint, gold furnace (Te.)

culli = fireplace, kiln (Ka.)

me~t = the eye (Santali)

mer.go = with horns twisted back; mer.ha, *m.,* mir.hi *f.=* twisted, crumpled, as a horn (Santali.lex.)

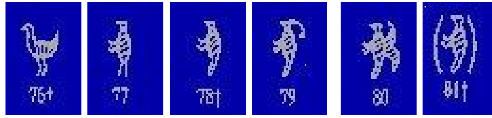
mer.hao = to entwine itself, wind round, wrap around, roll up (Santali.lex.)

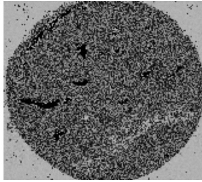
mer.ed, me~r.ed iron; enga mer.ed soft iron; sand.i mer.ed hard iron; ispa_t mer.ed steel; dul mer.ed cast iron; i mer.ed rusty iron, also the iron of which weights are cast; bicamer.ed iron extracted from stone ore; balimer.ed iron extracted from sand ore; mer.ed-bica = iron stone ore, in contrast to bali-bica, iron sand ore (Mu.lex.)

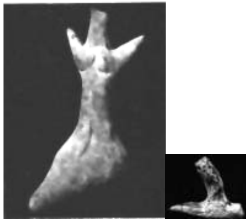
d.han:gar 'trough'; rebus: d.han:gara, t.hakkura, 'blacksmith'.

Relief spinner Louvre Sb2834.jpg Elamite epigraph of Susa. kut.he = leg of bedstead or chair (Santali.lex.) Rebus: kut.hi 'a furnace for smelting iron ore to smelt iron'; *kolheko kut.hieda* koles smelt iron (Santali) kol 'tiger' (Santali) [cf.tiger's legs of the bedstead] bed.a hako 'fish' (Santali) Rebus: bed.a 'either of the sides of a hearth' (G.) bhin.d.a a lump, applied especially to the mass of iron taken from the smelting furnace (Santali)
[Early form of hako is 'ayo'; rebus: ayas 'metal']
Six: bat.a (G.); Rebus: bat.a 'furnace'.




bat.a ‘quail’; rebus: bat.a ‘furnace’. Ligatured glyph of bird and fish enclosed within () may thus be a homograph of : bat.a ‘six’ = bat.a ‘quail’. The fish may be read rebus: bed.a ‘hearth’; rebus: bed.a hako ‘fish’. hako ‘fish’; rebus: hako ‘axe’. Could this be a representation of a special hearth used for casting ‘axes’?


Thigh of a sitting person. urseal9Seal; BM 122945; U. 16181; dia. 2.25, ht. 1.05 cm; Gadd PBA 18 (1932), p. 10, pl. II; each of four quadrants terminates at the edge of the seal in a vase; each quadrant is occupied by a naked figure, sitting so that, following round the circle, the head of one is placed nearest to the feet of the preceding; two figures clasp their hands upon their breasts; the other two spread out the arms, beckoning with one hand. If the orthographic intent is to image a ‘thigh’; the homonyms are: ukka_ ‘thigh’ (RV); ukka_ furnace (Pkt.) Alternative: ku_t.i = hip (Kui); ku_t.u = hip (Tu.); kut.a thigh (Pe.)(DEDR 1885); rebus: kut.hi = furnace (Santali)


Terracotta female, Gumla; Terracotta miniature plough; Jawaiwala, Bahawalpur (Weiner, 1984, Figs. 187 and 188)

ukka_ ‘thigh’ (Vedic) ukkalai the hips (Ta.); ukkal (Ma.); okkal, okkalai hip side of the body (Par..a. 290); okku (Ma.)(Ta.lex.)

ukka_ ‘furnace’ (Skt.) was- = fireplace (To.)(DEDR 2857).


Lothal050 cogu = food for birds (S.); cogga_ (L.); food for birds (P.)(CDIAL 4920). Rebus: jhoka_= one whose business is to feed a furnace or an oven (P.)

xola_ = tail (Kur.); qoli = id. (Malt.)(DEDR 2135).

ko_l raft, float (Ta.Ka.); kola , raft (Skt.BHSkt.); kulla (Palli)(DEDR 2238)

ko_la decoration (Ka.); ko_lam = form (Ta.Ma.)(DEDR 2240).

Rebus: kol = metal (Ta.)

khut.i Nag. (Or. khut.i_) diminutive of khun.t.a, a peg driven into the ground, as for tying a goat (Mundari.lex.)



m1181A 2222 Pict-80: Three-faced, horned person (with a three-leaved pipal branch on the crown), wearing bangles and armlets and seated, in a yogic posture, on a hoofed platform

kun.d.a ‘firepit’ (Skt.)

kundu = to sit (Ta.); kun.d.aru =,. kun.d.ru = to fall so as to sit on the ground (Ka.lex.) kun.d.ru, kun.d.aru, kul.ir, kul.l.ir, kul.l.iru, ku_d.aru, ku_d.ru = to sit down (Ka.) kun.d.rike, kun.d.arike = sitting down or on; that on which one sits down, as a mat, a cumbly (Ka.lex.) kudikilu, kudikilabad.u = to squat down (Te.lex.) kul.iyu, kul.irdu, kul.tu, kul.l.atu, kul.l.ardu, ku_tu, kuntu = having sat down (Ka.lex.) kuntu (kunti-) to sit on the heels with legs folded upright, squat; n. sitting on the heels, squatting (Ta.); kuttuka = to squat, sit on one’s heels (Ma.); kuton.u = to sit (Tu.); gontu-gu_rcun.du to squat, sit with the soles of the feet fully on the ground and the buttocks touching it or close to it; kudikilu, kudikila~bad.u to squat down; kundika_l.l.u, kundikundika_l.l.u = a boys’ game like leapfrog; kunde_lu hare (Te.); kud- to sit; kuttul = a stool to sit on (Go.)(DEDR 1728).

The glyph of seated person may be analysed with reference to the orthographic details depicted in two parts: one above the waist and the other below the waist.

Glyphs above the waist seem to depict the semant. of kiln, furnace. Glyphs below the waist seem to depict the semant. of workshop.

The substantive property item conveyed by the message is a kiln or furnace (cul.l.ai) for native metal (aduru).

cul.l.i = dry twigs, small stick, branch (Ta.); a dry spray, sprig, brushwood; cul.l.ai = a chip, fuel stick (Ma.); long pliable stick, stalk of plant (Ko.)(DEDR 2706).

cu_l.i = scales of fish (Ma.)(DEDR 2740).

cuila, coelo = sharp, pointed (Santali) s’u_la, s’u_le, sul.a, su_la, su_l.a = a sharp or pointed weapon: a pike, a spear, a lance; s’u_li = spearman; s’u_lika = piercing, killing (Ka.)

cu_l = pregnancy; cu_li = pregnant woman (Ta.); cu_l = pregnancy (Ma.Ka.); cu_lu = pregnancy, child, offspring; cu_li = child, offspring; cu~_d.i = pregnancy (Te.); su_l pregnant (animal)(Kuwi)(DEDR 2733).

Rebus: culli = a fireplace, a cooking stove, ole (Ka.) culli = a fireplace, a hearth, a funeral pile (Te.) cula_ sagad.i_ = a portable hearth or stove of iron, clay etc. (G.) culi_, culd.i_ = a small fireplace, a hearth; culo, cu_l, cu_lo = a fireplace, the hearth; a

stove (G.) culha = a fireplace; mit achia culha = a fireplace with one opening; bar achia culha = a fireplace with two openings (Santali) cul.l.ai = potter's kiln, furnace (Ta.); cu_l.ai furnace, kiln, funeral pile (Ta.); cul.l.a potter's furnace; cu_l.a brick kiln (Ma.); culli_ fireplace (Skt.); culli_, ulli_ id. (Pkt.)(CDIAL 4879; DEDR 2709). sulgao, salgao to light a fire; sen:gel, sokol fire (Santali.lex.) hollu, holu = fireplace (Kuwi); sod.u fireplace, stones set up as a fireplace (Mand.); ule furnace (Tu.)(DEDR 2857).

[Together with (1) cu_d.a_, 'bracelets', a number of other phonetic detrminatives are used in the orthography of the horned, seated person: (2) cu_d.a_, cu_la_, cu_liya_ tiger's mane (Pkt.) [note the mane on the face]; (3) cu_d.a, 'head-dress'. The rebus substantive points to: cu_l.ai, 'kiln, furnace'].

Mane ul.a (IL 1240)
ur..a = king's paraphernalia (Ma.)

Rebus: aduru 'native metal' (Ka.)

The face is depicted with bristles of hair, representing a tiger's mane.

cu_d.a_, cu_la_, cu_liya_ tiger's mane (Pkt.)(CDIAL 4883)

ka_ruvu = mechanic, artisan, Vis'vakarma, the celestial artisan (Te.); -ga_re = affix of noun denoting one who does it, e.g. samaga_re = cobbler (Tu.); garuva (Ka.); gar_uva = an important man (Te.) garia = in comp. Possessed of; doer or agent; badgaria = wise; bal garia = strong (Santali.lex.) gar [Skt. kr.; karavum = to do] a suffix found at the end of compounds, showing the 'doer of an action'; soda_gar = a seller; ka_ri_-gar = an artisan (G.lex.) If the pubes of the woman with spread out thighs are connoted by kut.hi, 'furnace'; the pictorial motif together with a foetus emerging out of the thights is intended to connote a furnace-artisan: kut.hi-gar_uva (pubes, foetus) or, alternatively: kut.hi-garu (furnace-mould).

ka_ruvu = mechanic, artisan, Vis'vakarma, the celestial artisan (Te.);
ga_re = affix of noun denoting one who does it, e.g. samaga_re = cobbler (Tu.);
garuva (Ka.); gar_uva = an important man (Te.) cf. –ka_ra *suffix*. 'worker' (Skt.)

Bristles, erection of hair of the body: garu, gaguru (Te.) [Note the imagery of bristles on the face of the seated person, almost looking like a tiger's mane. The tiger's mane is: cu_l.a; rebus: cu_l.a 'furnac, kiln' + bristles 'garu'; rebus: ga_re 'important person, worker'; thus the composite glyph can be read as: cu_l.a ga_re 'furnace-kiln worker'].
See also: Mane ul.a (IL 1240) ur..a = king's paraphernalia (Ma.)

karu = embossed work, bas-relief (Ta.); karukku (Ta.) karavi, karu, garu = a mould (Tu.) karuvi = tool (Ta.)[Thus, when tablets are embossed with glyphs to create objects in bas-relief, the artisan is trying to denote the nature of the function carried out by the –ga_re 'important person'; for example, when a tree is so depicted, it may represent kut.hi ga_re 'furnace worker'.]

Foetus karuvu, karugu (Te.) [Rebus: -ga_re 'important person, worker'. See the glyph of foetus emanating from a woman with her thighs spread out and lying upside down. kut.hi 'pubes'; rebus: kut.hi 'smelting furnace'; hence, the composite glyph connotes: kut.hi ga_re = furnace worker.]

The person wears bangles on his arms, from wrist to fore-arm.

cu_d.a = bracelet (Skt.); cu_d.a, cu_la bracelet (Pkt.);. cu_r.o (S.); cu_r., cu_r.a_ (L.P.); cur.o (Ku.); curo, curi (N.); suri_ a kind of ornament (A.); cu_r., cur.a_ bracelet (B.); cu_r.i_ (Or.Mth.); cu_ra_ anklet, bracelet (OAw.); cu_r.a_ ring on elephant's tusk, bracelet; cu_r.i_ bangle (H.); cu_r., cu_r.i_, cu_r.o (G.); cud.a_ (M.)(CDIAL 4883). chur. bangle, bracelet (P.) chhura_ (P.) tsud.o, tsude.a_ (Kon.); suri, surye (Kon:kan.i) [Note the glyph of a horned, seated person wearing bracelets from wrist to forearm]

Alternative rebus of glyphs of person seated on a platform: hasani 'furnace'; asani 'seated'; pin.d.i 'platform'; Rebus: *bhin.d.ia* 'a lump, applied especially to the mass of iron taken from the smelting furnace'.

The person wears a headdress with twigs; the glyph can be represented by two lexical clusters.

cul.li = dry twigs, small stick, branch (Ta.); a dry spray, sprig, brushwood (Ma.); cul.l.ai a chip, fuel stick; nul.l.i small sticks for firewood (Ma.); cul.k long pliable stick, stalk of plant (Ko.)(DEDR 2706).

ad.aru twig; ad.iri small and thin branch of a tree*; ad.ari* small branches (Ka.); *ad.aru* twig (Tu.)(DEDR 67). Cf. at.artti = thickly grown as with bushes and branches (Ta.)
d.ar a branch; *dare* a tree; a plant; to grow well; ban: *darelena* it did not grow well; *toa dare* mother, the support of life (Santali)
cavul.am, caul.am = tufted hair; cu_d.a_karumam (Ta.lex.). cu_d.a_ = topknot on head; cu_lika_ cockscomb (Skt.); cu_la_ ceremony of tonsure (which leaves the topknot)(Skt.); cu_l.a = crest; cu_l.a_ topknot (Pali); cu_d.a_, cu_la_, cu_liya_ topknot, peacock;'s crest (Pkt.); cula_ hair of head, lock, headdress (B.); cu_r. topknot, ceremony of tonsure (H.)(CDIAL 4883). cu_l.war = a grown-up woman wearing all her plaits of hair (Kho.)(CDIAL 4886). caud.a = relating to tonsure (skt.); caula (Mn.A_s'vGr.); co_laa shaving the head (Pkt.); col.e~ tonsure of a child's head (M.)(CDIAL 4936). [Note the seven women with plaited hair: cavul.a [plaited hair; rebus: cavat.u, lead-silver ore (fuller's earth) + bagala_ (pleiades; rebus: ban:gala_ goldsmith's furnace); the reading is: cavat.u ban:gala_ = furnace for lead-silver ore].

Stone Quarry

pan.e ground that is worked; tillage; a quarry (Ka.Ma.); pan.ai, pan.n.ai (Ta.); pan.n.eya, pan.ya, pan.e a farm, a landed estate (Ka.lex.) ba_n:ggar land dependent on rainfall; hard, barren soil (P.lex.) cf. va_n-am-pa_rtta-pu_mi id. (Ta.lex.) banjri land irrigated by canal water alone (P.lex.) pan.e quarry; kalpan.e quarry where red laterite stones are cut (Tu.lex.) *pan.ai, pan.n.ai* agricultural tract, garden (Ta.); pan.a

ground which is worked (including stone-quarry (Ma.)(DEDR 3891). *pad.uku* stone (Te.); *pan.ku* id. (Kond.a)(DEDR 3890).

pan.ai pipal (Ta.); pan.i id. (Ka.)(DEDR 3895).

phan.i_, phan.i_dhar, phan.i_ndra a large serpent (G.); *phan.a_, phan.i_* the hood of a serpent (G.); phen.a [Dh. Des. *phad.a_;* Hem. Des. *phad.am* fr. Skt. *phan.a_*] the hood of a snake (G.) *pat.am* cobra's hood (Ta.Ma.); *ped.e* id. (Ka.); *pad.aga* id. (Te.); *par.ge, bar.ak, bar.ki, bir.ki* hood of sepent (Go.); *(s)phat.a, sphat.a_* a serpent's expanded hood (Skt.); *phad.a_* id. (Pkt.)(DEDR App. 47; CDIAL 9040).

d.hon.d.-phod.o [M. dhon.d.a_, a stone] a stone-cutter, a stone-mason; *d.hon:d.-jhod..o* [M. *dhon.d.a_* a stone + *jhod.avum*] a stone-cutter; a stone-mason; *d.hon.d.o* a stone; a blockhead; a stupid person (G.)

dho~n.d. a species of snake found in water; *bitkil dho~n.d., raj dho~n.d., ayan: dho~n.d.* (Santali) *d.ond.ya_* water-snake (Kol.); *d.ond.uli, dho_ndi_* (Go.); < *dun.d.ubha* (Skt.)(DEDR 2985; CDIAL 6411).

Other homonyms: **d.hon.d.** = a big wood pigeon (P.lex.)

dondhor.o, dondkor.o squatting, cowering, sitting close to the ground (Santali)

d.on.d.o polled, as an ox or buffalo (G.)
d.on.d.obot to salute by bowing down *(Santali)*

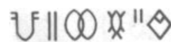
d.ondor a cave*, den; don.d.hor* a hole, a hollow; d.od.hio hollow; *d.od.hor* a hole, a hollow; a cavity, hollow (Santali)

d.on.t.ho, dhon.t.ho, dhon.t.o a knot (Santali)

dod.o = an ear of corn (G.lex.)

dhon.d.ra khalak a large leaf cup; *d.hon:ga* 'a dugout, a boat made from a hollowed out tree, a wooden trough' (Santali) *don* 'a wooden trough' (Santali)

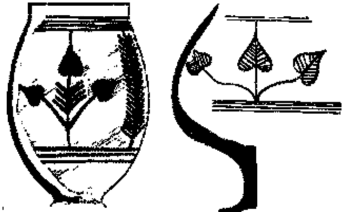
That silver metal --khura--is conveyed by the glyph (hoof on the legs of the stool) is reinforced on other epigraphs where a person is shown seated on a stool.

 m0453At  m453BC  1629 Pict-82 Person seated on a pedestal flanked on either side by a kneeling adorant and a hooded serpent rearing up.

h95-2485 sides 1 and 2. Harvard Harappa Project. The bunch of twigs = ku_di_, ku_t.i_ (Skt.lex.) ku_di_ (also

written as ku_t.i_ in manuscripts) occurs in the Atharvaveda (AV 5.19.12) and Kaus'ika Su_tra (Bloomsfield's ed.n, xliv. cf. Bloomsfield, American Journal of Philology, 11, 355; 12,416; Roth, Festgruss an Bohtlingk, 98) denotes it as a twig. This is identified as that of Badari_, the jujube tied to the body of the dead to efface their traces. (See *Vedic Index*, I, p. 177). Rebus: kut.hi 'a furnace for smelting iron ore to smelt iron'; *kolheko kut.hieda* koles smelt iron (Santali) kaca kupi 'scorpion' (Santali) Rebus kacc = iron (Go.)



Substantive: aduru 'native metal'.

ad.rna_ to twist back one's limbs or bend the body inward (as under threat of a blow)(Kur.); ad.re to strut; ad.ro a swaggerer (Malt.)(DEDR 108). [cf. the glyphs of antelope and tiger with their heads turned backwards.]

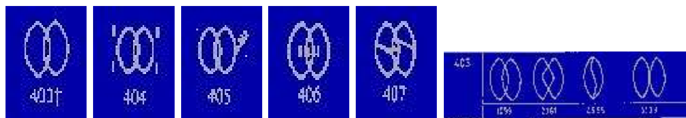
ad.aru twig; ad.iri small and thin branch of a tree; ad.ari small branches (Ka.); ad.aru twig (Tu.)(DEDR 67).

Goblet, black on red slip, Nausharo ID, Kachi Plain, Baluchistan (After Samzun, A., 1992, Observations on the characteristics of the pre-Harappan remains, pottery, and artifacts at Naudsharo, Pakistan (2700-2500 BCE) in: C. Jarrige, ed., South Asian Archaeology 1989, 245-252, Madison, Wisc.: 250, fig. 29.4, no.2, Mission Archeologique de Indus. Goblet. Mundigak IV, 1, eastern Afthanistan (After Casal, J.M., 1961, Fouilles de Mundigak, I-II, Memoires de la delegation archeologique francaise en Afghanistan 17, Paris. II: fig. 64, no.171, Delegation Archeologique Francaise en Afghanistan.

Kalibangan029 8018 ad.aren 'lid'; rebus: aduru 'native metal'

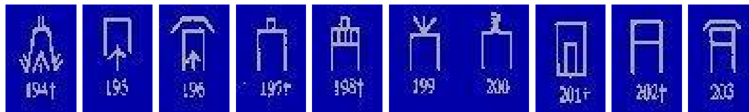
Portable stove of a goldsmith, ban:gala

ban:gala = kumpat.i = an:ga_ra s'akat.i_ = a chafing dish a portable stove
a goldsmith's portable furnace (Te.lex.) cf. ban:garu ban:garamu = gold (Te.lex.)

V403 ban:gad.i_ a bangle, a bracelet of glass, gold, or other material, worn on the wrist by women (G.lex.) bhagan.a = a bangle (IA 19)(IEG) ban:gan = bangle (cf. Ka_li_ban:gan, black bangle: name of a site on River Sarasvati banks)

bahula_ = Pleiades (Skt.) bagal.a_ = name of a certain godess (Te.lex.) bagal.a_, bagal.e, vagala_ (Ka.); bakala_, bagal.a_, vagal.a_ (Te.); bagal.a_devi = one of the

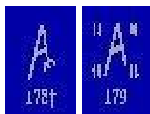
s’akti deities by means of which one may shut the mouth of an opponent, etc. (Ka.lex.) bakkula = a demon, uttering horrible cries, a form assumed by the Yakkha Ajakala_paka, tto terrify the Buddha (Pali.lex.) bahula_ pl. the Pleiades (VarBr.S.); bahulika_ pl. (Skt.); bahul (Kal.); ba_l, baul, balh (Kho.); bol, boul, bolh (Kho.); bale (Sh.)(CDIAL 9195). bahulegal. = the Pleiades or Kr.ittika_-s (Ka.lex.) bahula_ (VarBr.S.); bahul (Kal.) six presiding female deities: vahula_ the six presiding female deities of the Pleiades (Skt.); va_kulai id. (Ta.)(Ta.lex.) 5719.Image: pleiades: bahulika_ pl. pleiades; bahula born under the pleiades; the pleiades (Skt.lex.) bahule, bahulegal. the pleiades or kr.ttika_s (Ka.)(Ka.lex.) Image: female deities of the pleiades: va_kulai < vahula_ the six presiding female deities of the Pleiades; va_kule_yan- < va_kule_ya Skanda (Ta.lex.) pa_kulam < ba_hula the month of Ka_rttikai = November-December; pa_kul.i full moon in the month of purat.t.a_ci (Vina_yakapu. 37,81)(Ta.lex.) ba_hule_ya Ka_rttike_ya, son of S'iva; ba_hula the month ka_rttika (Skt.Ka.)(Ka.lex.)

 bha_gal.a = a gate in the wall of a town; the precincts of a village; bazaar (G.lex.)

bagalo = an Arabian merchant vessel (G.lex.) bagala = an Arab boat of a particular description (Ka.); bagala_ (M.); bagarige, bagarage = a kind of vessel (Ka.)(Ka.lex.)



bakhor. = teeth of a comb (Santali.lex.) kangha (IL 1333) kan:g = brazier, fireplace (K.)(IL 1332) kan:kata = comb (Te.) Rebus: kan:gar = portable furnace (K.)



va_holo = adze; vahola_ = mattock; bahola_ = a kind of adze (P.lex.)
Rebus: ban:gala = kumpat.i = an:ga_ra s’akat.i_ = a chafing dish, a portable stove, a goldsmith’s portable furnace (Te.lex.) cf. ban:garu, ban:garamu = gold (Te.lex.)

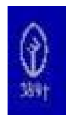
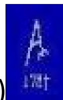
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Fire-pit, furnace, kulme

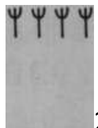
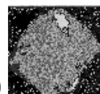
kolime, kolume, kulame, kulime, kulume, kulme fire-pit, furnace (Ka.); kolimi furnace (Te.); pit (Te.); kolame a very deep pit (Tu.); kulume kanda_ya a tax on blacksmiths (Ka.); kol, kolla a furnace (Ta.) *kole.l* smithy, temple in Kota village (Ko.); *kwala.l* Kota smithy (To.); *konimi* blacksmith; *kola* id. (Ka.); *kolle* blacksmith (Kod.); *kollusa_na_* to

mend implements; *kolsta_na, kulsa_na_* to forge; *ko_lsta_na_* to repair (of plough-shares); *kolmi* smithy (Go.); *kolhali* to forge (Go.)(DEDR 2133).] kolimi-titti = bellows used for a furnace (Te.lex.) kollu- to neutralize metallic properties by oxidation (Ta.lex.) kol brass or iron bar nailed across a door or gate; kollu-t-tat.i-y-a_n.i large nail for studding doors or gates to add to their strength (Ta.lex.) kollan--kamma_lai < + karmas'a_la_, kollan--pat.t.arai, kollan-ulai-k-ku_t.am blacksmith's workshop, smithy (Ta.lex.) cf. ulai smith's forge or furnace (Na_lat.i, 298); ulai-k-kal.am smith's forge; ulai-k-kur-at.u smith's tongs; ulai-t-turutti smith's bellows; ulai-y-a_n.i-k-ko_l smith's poker, beak-iron (Ta.lex.) [kollulaive_r-kan.alla_r: nait.ata. na_t.t.up.); mitiyulaikkollan- mur-iot.ir.r.an-n-a: perumpa_)(Ta.lex.) Temple; smithy: kol-l-ulai blacksmith's forge (kollulaik ku_t.attin-a_l : Kumara. Pira. Ni_tiner-i. 14)(Ta.lex.) cf. kolhua_r sugarcane milkl and boiling house (Bi.); kolha_r oil factory (P.)(CDIAL 3537). *kulhu* 'a hindu caste, mostly oilmen' (Santali) kolsa_r = sugarcane mill and boiling house (Bi.)(CDIAL 3538).

kola_ burning charcoal (L.P.); ko_ila_ burning charcoal (L.P.N.); id. (Or.H.Mth.), kolla burning charcoal (Pkt.); koilo dead coal (S.); kwelo charcoal (Ku.); kayala_ charcoal (B.); koela_ id. (Bi.); koilo (Marw.); koyalo (G.)(CDIAL 3484). < Proto-Munda. ko(y)ila = kuila black (Santali): all NIA forms may rest on ko_illa.] koela, kuila charcoal; khaura to become charcoal; ker.e to prepare charcoal (Santali.lex.)

 (29) Sign 178 (35)  'Tree' Field symbol 44 (6)

Grapheme: ko_lemu = the backbone (Te.)

 2949 Dotted circles  2950  Rojdi

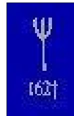
PLUS a number of variants and with ligatures: Signs162, 167, 169, 387,389 +variants; Ligatures: Signs163, 166-6, 168, 90, 91,223,224,227,235.262,270,273,274, 282,283,291,331, 347-352, 355-357,371,372, 388-390,395,405

kolom = cutting, graft; to graft, engraft, prune; kolom dare kana = it is a grafted tree; kolom ul = grafted mango; kolom gocena = the cutting has died; kolom kat.hi hor.o = a certain variety of the paddy plant (Santali); kolom (B.); kolom mit = to engraft;

kolom porena = the cutting has struck root; kolom kat.hi = a reed pen (Santali.lex.) cf. kolom = a reed, a reed-pen (B.); qalam (Assamese.Hindi); kolma hor.o = a variety of the paddy plant (Desi)(Santali.lex.Bodding) kolom baba = the threshed or unthreshed paddy on the threshing floor; kolom-ba_rum = the weight a man carries in taking the paddy from the threshing floor to his house; kolom = a threshing floor (Mundari); cf. kal.am (Tamil) [Note the twig adoring the head-dress of a horned, standing person]

ku_l.e stump (Ka.) [ku_li = paddy (Pe.)] xo_l = rice-sheaf (Kur.) ko_li = stubble of jo_l.a (Ka.); ko_r.a = sprout (Kui.) ko_le = a stub or stump of corn (Te.)(DEDR 2242). kol.ake, kol.ke, the third crop of rice (Ka.); kolake, kol.ake (Tu.)(DEDR 2154) [kural = corn-ear (Ta.)]

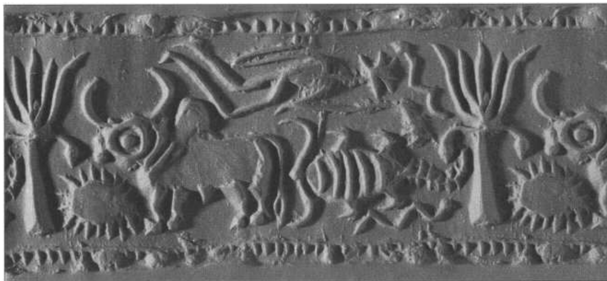
Five-petalled plant or five-branched shrub

 m1123 

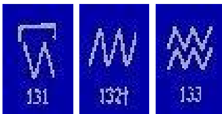
kolma hor.o ‘ a variety of rice plant’ (Santali.lex.) kolame ‘furnace, smithy, forge’ (Ka.)



Are these Signs 162 and 169 distinct are simply homographs, connoting the same word?



Given the orthographic representation of five-petals on Sign 169, this glyptic representation of a ‘sprout’ can be related to another unique 5-petalled plant, ‘tabernae montana’ shown on Ur cylinder seal with *taberna montana* plant, BM 122947; Signs 162 and 169 Based on this identification, we can conclude that Sign 162 denoted kolma ‘rice-plant’; while Sign 169 denoted tagara, ‘tin’.



tagara wave (Si.)(CIDAL 5699).

tagar = to be stopped or impeded; to impede (Ka.lex.) [cf. the motif of a person holding back tigers or bulls on either side].

tagr.a = large, massive, strong; tagoj = strength (Santali.lex.)

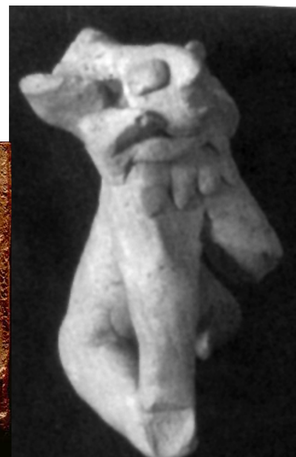
tagar. = a trough; tagar.re surti ar cunko sipia they mix surti and lime in a trough (Santali.lex.) taga_rum [Pers. tagarih] a bricklayer's trough; a hod (G.lex.)

ero = watering place for cattle (G.) Rebus: era, eraka 'copper' (Ka.)

Tub: go_lemu (Te..) gollemu, gol.l.emu (Te.) Rebus: kolame 'furnace' (Ka.)

tagara = ram (Te.lex.); takaram (Ta.lex.); t.agaru, t.agara, t.igaru, tagar = a ram (Ka.); tagara, tan:gad.i_ (H.M.); tagade_ra, tagate_ra = having a ram for his vehicle: fire (Ka.)(Ka.lex.) Old Tamil: takar 1. sheep; 2. ram; 3. goat; 4. aries in the zodiac; 5. male ya_r..i 6. male elephant; 7. male shark. t.agarudaleya, t.agarutaleya = daks.abrahmanu, Daks.a, the son of Brahma_, father of Durga_ and father-in-law of S'iva, who on one occasion celebrated a great sacrifice to obtain a son, but omitted to invite S'iva, wherefore S'iva interrupted the sacrifice, and by his incarnation Vi_rabhadra had Daks.a decapitated; for the decapitated head that of a ram was substituted (Ka.lex.) 4080.<u>Images: ram; male elephant; male shark</u>: takar sheep, ram, goat, male of certain other animals (porutakar ta_kkar-ku-p- pe_run takaittu : Kural.486); male elephant; male shark (Ta.lex.) (ya_l.i, elephant, shark)(Ta.); takaran huge, powerful as a man, bear, etc. (Ma.); tagar, t.agaru, t.agara, t.egaru ram (Ka.) tagaru, t.agaru id. (Tu.); tagaramu, tagaru id. (Te.); tagar id. (M.)(DEDR 3000). tan:gad.i_, tagara a ram (M.H.); tagade_ra having a ram for his vehicle: fire; tagarven.agisu to cause rams to fight (Ka.lex.) da_dlo bokro ram (Kon.lex.) [cf. kara_ male alligator; kar.e_n.u elephant (Ta.lex.)]

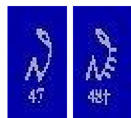
Alloy: tara_ alloy of 8 parts of copper to 5 of tin, used for making metal vessels (pukar..tara_-p-po_kkillai) (Cine_n-. 169)(Ta.lex.)



Rebus glyph: ta_ra_ = stars (Skt.)

tagad.o = [Skt. trika a group of three] the figure three (3)(G.lex.) [Note. Three persons shown next to a tree on a tablet].





panjhar 'ribs'; rebus: pasra 'smithy';



vikalpa: ko_lemmu = the backbone (Te.lex.) Rebus: kolame 'furnace' (Ka.)

Pictorial motifs of spearing or killing

koru, kori, korru to kill (Kor.) kol 'to kill' (Ta.) kola = killing, e.g. a_d.ukola = woman-slaying (Te.) kol =metal (Ta.) go.l- (god.d.-) to beat, shoot with bow; god. to cut with axe (Kol.); gor.- (got.-) to strike, beat, kill (Nk.); kol. (kol.v-, kon.t.-) to strike, hurt; ko_l. killing, murder (Ta.); kol.ka (kon.t.-) to hit, take effect, come in contact (Ma.);

kol.l.ikka to hit; ko_l. hitting, wound, damage (Ma.); kol.-/kon.- (kod.-) to pain, trouble (Ko.); kwil. (kwid.-) to quarrel (To.); kon.pini to hit; kol.puni, kolpuni to come into collision (Tu.); konu to be pierced as by an arrow (Te.)(DEDR 2152).

kulai = a hare (Santali)

Rebus: *koru* 'a bar of metal' (Tu.)

The act of throwing a spear may be connoted by lexemes: d.an:gara, d.a_n:gara = throwing (Skt.lex.) Rebus: d.hangar 'blacksmith' (H.)

xolla_ (Kur.) razor

"The motif of a figure grasping two felines (usually tigers) by the neck is found on another tablet from Harappa (the twisted terracotta example illustrated) and on tablets and seals from Mohenjo-daro. One of those from Mohenjo-daro appears to depict a male with genitalia (Parpola, 1994, p. 247 and Franke-Vogt, 1991; Taffel XXXV: 248). Other examples are not so clear, but they have usually been assumed to represent males. As a likely female, the figure from Harappa conforms in sex with depiction of a composite female-bovine figure grasping a horned tiger on a seal from Mohenjo-daro (Franke-Vogt, 1991: Taffel XXXVI: 263). A Parpola (1994, p. 246) points out, the 'contest' motif is one of the most conincing and widely accepted parallels between Harappan and Near Eastern glyptic art.' In the Harappan case, however, bulls and lions are replaced by tigers, and females as well as males are depicted as 'hero(ine)'. Another interesting feature of the tablets is that whereas the bovine especially are depicted as clearly male, the sex of the huian figures is often not so evident." [Richard Meadow and Jonathan Mark Kenoyer, 1997, Excavations at Harappa 1994-1995: new perspectives on the Indus scriptl, craft activities, and city organization, in: Raymond Allchin and Bridget Allchin, 1997, *South Asian Archaeology 1995*, Oxford and IBH Publishing].

"We have found two other broken tablets at Harappa that appear to have been made from the same mold that was used to create the scene of a deity battling two tigers and standing above an elephant. One was found in a room located on the southern slope of Mount ET in 1996 and another example comes from excavations on Mound F in the 1930s. However, the flat obverse of both of these broken tablets does not show the spearing of a buffalo, rather it depicts the more well-known scene showing a tiger looking back over its shoulder at a person sitting on the branch of a tree. Several other flat or twisted rectangular terracotta tablets found at Harappa combine these two narrative scenes of a figure strangling two tigers on one side of a tablet, and the tiger looking back over its shoulder at a figure in a tree on the other side." [JM Kenoyer, 1998, p. 115].

Feline figurine terracotta. A woman's face and headdress are shown. The base has a hole to display it on a stick. (After JM Kenoyer/Courtesy Dept. of Archaeology and Museums, Govt. of Pakistan).

It appears that the person holding back the two rearing jackals on the tablet is a woman: ko_l 'woman' (Nahali); dual. ko_lhilt.el (Sudhibhushan Bhattacharya, Field-notes on Nahali, *Ind. Ling.* 17, 1957, p. 247); kola = bride, son's (younger brother's) wife (Kui) ko_l is a phonetic determinative of the two jackals, kol 'tiger'; rebus: kol 'metal' (Ta.)

The decoding of 'woman' glyph on the tablet as a phonetic determinative of kol 'tiger' gains surprising validation from a ligatured terracotta image of a feline tiger with a woman's face and headdress..



Mesopotamia. Cylinder seal, ca. 2254-2220 BCE (mature); ceramic; cat. 79; two groups in combat. A naked, bearded hero wrestles with a water buffalo, and a bull-man wrestles with a lion. In the centre: inscription (unread). Appears to be recut. Pictorial motif: Person grappling with two tigers standing on either side of him and rearing on their hindlegs.



Person throwing a spear at a buffalo and placing one foot on the head of the buffalo. 2279 seal impression, Mohenjodaro (DK 8165); after Mackay 1938: pl.88, no.279

ad.arincu, ad.arucu *caus.* of ad.a.ru = to shoot as a missile (Te.)

aduru = native metal (Ka.)

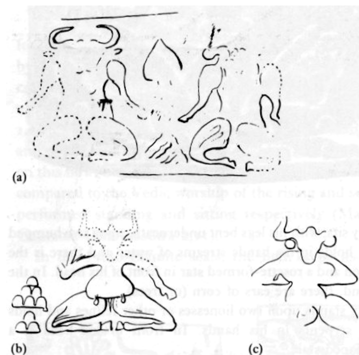
homa = bison (Ko.)

soma = electrum (Skt.); hom = gold (Ka.)





Motif of buffalo horns is combined with six-pointed star. [After Parpola, 1994, Fig. 14.19: Painted pottery, c. 3000-2600 BCE. a. Kot Diji, Sind; b,c. Gumla, NW Frontier Province; d. Burzahom, a Kashmir Neolithic site. After H.D. Sankalia, 1974, *The prehistory and protohistory of Bha_rata and Pakistan.* Poona, 354, fig. 88: k].

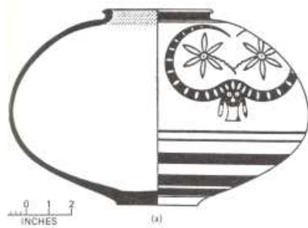


Buffalo's horns. Gumla, NW Frontier province. After Sankalia 1974: 354, fig. 88: b (=b), c (=c)

Buffaloes sitting with legs bent in yogic a_sana. Susa Cc-Da, ca. 3000-2750 BC, proto-Elamite seals: (a-c) After Amiet 1972: pl. 25, no. 1017 (=a); and Amiet 1980a: pl. 38, nos. 581-2 (b-c)

sal 'Indian gaur'; sal sakwa 'horns of indian gaur'.

Furnace or forge of a smith; a goldsmith's smelting pot; torch: ukka_ (Vedic ulka_ and ulkus.i_; Latin volcanus; Old Irish olca_n to be fiery) firebrand, glow of fire, torch; tin.-ukka_ firebrand of dry grass; ukka_ a furnace or forge of a smith; a meteor;



ukka_-dha_ra a torch-bearer; ukka_-pa_ta falling of a firebrand, a meteor; ukka_-mukha the opening or receiver of a furnace, a goldsmith's smelting pot = kamma_r'uddhana (Pali); ukka_cana_ enlightening, clearing up, instruction; ukka_cita enlightened, made bright; (fig.) or cleaned, cleared up; ukka_ceti to bale out water, to empty by means of buckets (Pali)(Pali.lex.) Image: fireplace: cf. cu_l.ai kiln, furnace, funeral pile (Ta.); culli_, ulli_ fireplace (Pkt.)(DEDR 2709)(CDIAL 4879). huko, hukko [Hem. Des. ukka_ fr. Skt. ulka_ a firebrand; Arabic hukka a casket] a smoking apparatus; a *hukkah* (G.) huka the hooka, the hubble bubble (Santali) sukar evening star (Santali.lex.) cukkai star (Ta.); cukka star (Te.); cikke, cikki star (Ka.); sukka star (Kol.); cukka (c = ts) id. (Nk.); cukkin id. (Nk.); cukka id. (Pa.); sukka star (Ga.); sukkum, huko, hukka, hukkom, hukka, ukkum, ukka, ukam id. (Go.); suka id. (Kond.a); huka (pl. -n) id.; hukeran, hukerin (pl. only recorded) stars (Pe.); hukerin id. (Mand..); suka star (Kui); hu_ka, hukka id.; suk'erika stars (Kuwi)(DEDR 2646).
http://www.hindunet.org/saraswati/dictionary/2863TO.HTM 3132.Bright; handsome: s'ukra bright; brightness (RV.); s'ukla bright, white (AitBr.); bright half of month (Gr.S'r.); sukka bright (Pali); s'ukar pretty, pleasant; s'uka_r quietly (Gypsy); s'u_kri naked (woman)(Kal.); chuk good fortune (N.); suk bright, white; bright half of month (H.); su_kad.i sandal-wood (OG.); sukhar. (G.); sukkila, sukkilla bright, white (Pkt.); s'ukl.i_ moon; s'uklo_ white (WPah.); s'ukula white (D..); sukilo white, shining (Ku.N.); xukula_ (A.); sukka planet, star (Pali); sukka the planet Venus (Pkt.); s'u_k-ta_ra_ (WPah.); suk-ta_ra_ Venus (B.); su_k, suk Venus, Friday (H.); su_k Venus (M.)(CDIAL 12506).

Meteor, to shine ul.ku, ul.uku (Ka.); ulka_ (Skt.); ul.ku = to shine (Ka.); ukka_ (Pkt.) [Note two stars shown as phonetic determinants of a water-carrier on a Mesopotamian Gadd seal]. ukka_, 'stars'; rebus: ukka_, 'furnace'; ka_~vad.iyo, 'water-carrier'; rebus: kamat.ha_yo, 'carpenter'; alternative: kut.i 'woman water-carrier'; rebus: kut.hi 'furnace'.

suk'erika 'stars' (Kuwi)(DEDR 2646) *sukar, sukor* 'the planet vennus as evening star' (Santali) Rebus: *sokol* 'fire' (Santali)



Buffalo-horned divinity. Painting on a jar. Kot Diji. C. 2800-2600 BCE [After Khan 1965, pl. XVIIb; cf. Fig.



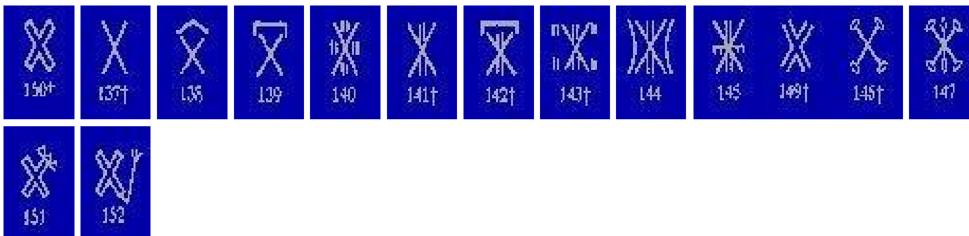
2.25 in JM



Kenoyer, 1998, *Ancient cities of the Indus Valley Civilization*, Karachi, Oxford University Press].
http://www.heritage.gov.pk/html_Pages/history1.html

mu~he~ = face; rebus: **mu~ha_** = quantity of iron smelted at one time in the earthen furnace of the Kolhes (Santali)

kad.a buffalo (Santali); Rebus: **kad.iyo** [Hem. Des. kad.a-i-o = Skt. sthapati a mason] a bricklayer; a mason (G.)
Painted pottery, Mehergarh. http://www.heritage.gov.pk/html_Pages/history1.html



bat., bat.e = a road; bat. par.a = a highwayman, a spy (Santali.lex.) bhat.akavum [Skt. bhra_nta wandered fr. bhram to wander] to roam, to wander; bhat.aka_m pl. wanderings (G.lex.) bhat.au to go about, to go here and there, as a dog in heat (Santali.lex.) bha_t.iyo = a class of va_nia_s; a milkman; a vegetable-seller; bha_t.hela_ pl. a class of bra_hman.as (G.lex.) *dobat.ia* 'cross roads, the junction of two roads' (Santali) bat.oi traveller (Ku.); bat.ohi (N.); ba_t.oi, ba_t.ei (N.); bat.ohi_, bat.ohia_, bat.ohini (Mth.); bat.o(h)i_ (H.)(CDIAL 11367).

Rebus: bat.a 'furnace' (G.)  Sibri-damb01A  Sibri-damb01B Tepe Yahya. Rectangular steatite (?) stamp seal with perforated knob on the back with lines crossed from corner to opposite corner. Impression on a pottery sherd of a Harappan seal of a type illustrated by Joshi and Parpola (Joshi and Parpola 1987: 88-100). Lamberg-Karlovsky and Tosi 1973: fig. 121.







kulhi = village street (Santali) kol ‘metal’ (Ta.)

Smith, karma_ra

kamar a semi-hinduised caste of blacksmiths; kamari the work of a blacksmith, the money paid for blacksmith work; nunak ato reak in kamarieda I do the blacksmith work for so many villages (Santali) ka_rma_ra = metalsmith who makes arrows etc. of metal (RV. 9.112.2: jarati_bhih os.adhi_bhih parn.ebhih s'akuna_na_m ka_rma_ro as'mabhih dyubhih hiran.yavantam icchati_) kammar a, kamma_ra, kammaga_ra, karma_ra, karmaka_ra, kammaga_ra, kamba_ra = one who does any business; an artisan, a mechanic; a blacksmith (Ka.) kamma_l.a = an artisan, an artificer: a blacksmith, a goldsmith (Ta.Ka.); a goldsmith (Ka.) kammara = the blacksmith or ironsmith caste; kammaramu = the blacksmith’s work, working in iron, smithery; kammarava_d.u, kammari, kammari_d.u = a blacksmith, ironsmith; kammarikamu = a collective name for the people of the kamma caste (Te.) karma_ras’a_la = workshop of blacksmith (Skt.) kamma_r-asa_le = the workshop of a blacksmith (Ka.); kamasa_lava_d.u = a blacksmith (Te.) kamarsa_ri_ smithy (Mth.) kamba_r-ike, kamma_r-ike = a blacksmith’s business (Ka.Ma.)(Ka.lex.)(DEDR 1236). karmaka_ra = labourer (Pa_n.ini's As.t.a_dhya_yi: ka_rukarma = artisan's work (Arthas'a_stra : 2.14.17); karma_nta = a workshop or factory (Arthas'a_stra : 2.12.18, 23 and 27, 2.17.17, 2.19.1, 2.23.10).



The seated person wears a waist-band.

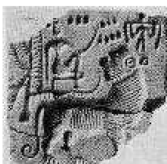
Rebus: karma_ras’a_la = workshop of blacksmith (Skt.) [Note the pannier tied as a waist band to the one-horned heifer.]

Glyph: kamarsa_la = waistband (Te.)

kamba, kambha = Tbh. of stambha or skambha = a post, a pillar (Ka.Te.Tu.Ma.M.Skt.); a mast (Ta.Ma.) kambhagat.t.u = a construction on pillars (Ka.)

kambu = a conch, a shell (Ka.); a bracelet (Ka.)

kamarasa_la = waist-zone, waist-band, belt (Te.) kammaru = the loins, the waist (Ka.Te.M.); kamara (H.); kammarubanda = a leather waist band, belt (Ka.H.) kammaru = a waistband, belt (Te.) kammarincu = to cover (Te.) kamari = a woman’s girdle (Te.) komor = the loins; komor kat.hi = an ornament made of shells, resembling the tail of a tortoise, tied round the waist and sticking out behind worn by men sometimes when dancing (Santali) kambra = a blanket (Santali)



krammar-a = to turn, return (Te.); krammar-ilu, krammar-illu, krammar-abad.u = to turn, return, to go back; krammar-u = again; krammar-incu = to turn or send back (Te.lex.) [Note the glyph showing an antelope or a tiger turning back]. kraman.a = act of

walking or going (G.lex.) krama = step, series (AV); krame_n.a by degrees (R.); kama = step, way (Pali); foot, series (Pkt.); -krem in oi~n-krem and u~_-krem = upper and lower teeth (Wg.); krammar-ilu, krammar-illu, krammar-abad.u = to turn, return, to go back; krammar-u = again; krammar-incu = to turn or send back (Te.lex.) [Note the glyph showing an antelope or a tiger turning back]. kraman.a = act of walking or going (G.lex.) krama = step, series (AV); krame_n.a by degrees (R.); kama = step, way (Pali); foot, series (Pkt.); -krem in oi~n-krem and u~_-krem = upper and lower teeth (Wg.) *kamra = the back (Skt.); krem = the back (Kho.)(CDIAL 2776). *parikamra = near the back (Skt.); parikama_ = behind the shoulder (Ash.)(CDIAL 7799v). kamak =back (Sang.); com = back of an animal (Shgh.); *kamak = back of an animal (G.M.); kama neck (Yghn.)(CDIAL 14356).

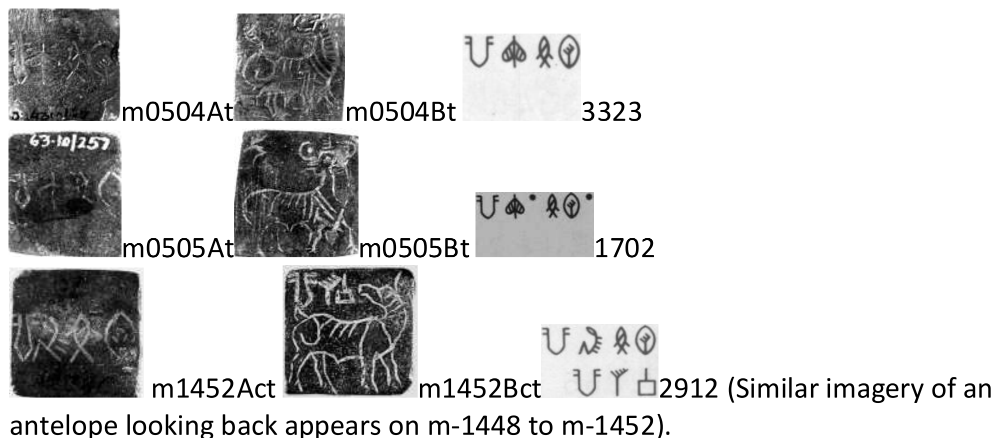
m309



m0309 k049 m0310AC 1355

Kalibangan049 8013 h163

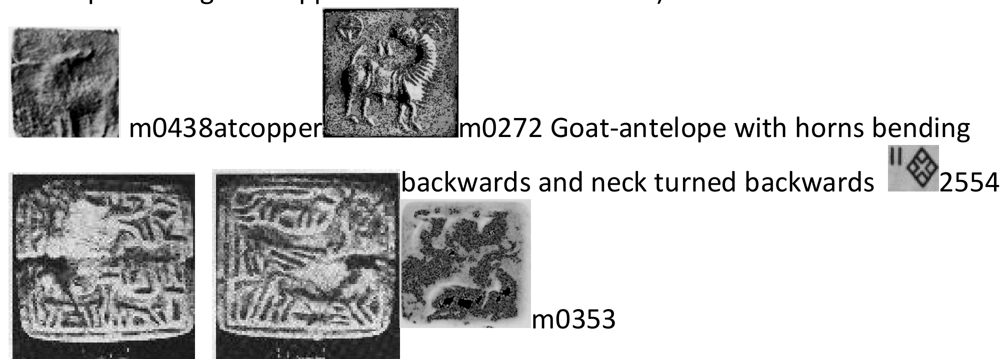
h181A



m0504At m0504Bt 3323

m0505At m0505Bt 1702

m1452Act m1452Bct 2912 (Similar imagery of an antelope looking back appears on m-1448 to m-1452).



m0438atcopper m0272 Goat-antelope with horns bending backwards and neck turned backwards 2554

m0353

Prabhas Patan (Somnath) pbs-001 a,b Two sides of a seal; obverse: three antelopes from top to bottom and in growing sizes; reverse: bottom register: antelope and tiger looking backwards; middle: antelope; top: illegible, perhaps the horns of the head of an antelope.
Substantive: *aduru* 'native metal'.

*ad.rna_* to twist back one's limbs or bend the body inward (as under threat of a blow)(Kur.); *ad.re* to strut; *ad.ro* a swaggerer (Malt.)(DEDR 108). [cf. the glyphs of antelope and tiger with their heads turned backwards.]

kamari, kammari declivity, steep bank, cliff, ravine (Ka.); kamar chasm, crack, cleft in the ground caused by drought (Ta.)(DEDR 1229).

kamar kidin a small species of scorpion; *kidin, kidin kat.kom* a scorpion; *kidin marmar* a species of centipede (Santali)

An antelope is shown with a seven-pointed star around a dotted-circle on tablet h-349.


h349A

h349B

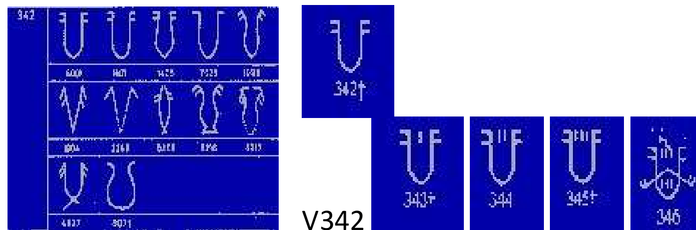
Copper work

Copper work; brazier: kan copper work, copper; kan- n-a_n brazier (Ta.); bell metal worker, one of the divisions of the Kamma_l.a caste (Ta.lex.) kanna_n id. (Ma.)(DEDR 1402). kan workmanship (Tiv. Tiruva_y. 5,8,3); kan mam (Tiv. Tiruva_y. 6,2,7)(Ta.) kanaka = a metal (Pali); kanaka = gold (Skt.)

kan.d. furnace, altar (Santali) gan.d.a pit (furnace) kan.d.i = furnace, altar; khandha = a trench used as a fireplace when cooking has to be done for a large number of people (Santali.lex.) kandaka = a ditch, a trench (Ka.); khandaka (M.H.Te.)(Ka.lex.) This lexeme can be denoted by the dotted circle which is often depicted on ivory (khan.d.) objects. *khan.d.ar.an:, khan.d.run:* 'pit (furnace)' (Santali)

me~rhe~t khan.d.a 'iron implements' (Santali) This compound phrase indicates that khan.d.a also meant 'implements'. Thus the glyph of 'rim of jar' kan.d.a kan-ka may denote fire altar, furnace and also metal implements (or, more precisely, furnace/altar for making metal implements).

khan.n.a = that which is dug (Pkt.lex.) **khana** = a trench, a pit, a hollow in the ground (Santali.lex.) [**khan** = a mine (Santali) ?khani = mine (VarBr.S.); khan.i = mine (Pkt.); khani (A.); khan (H.); khan. = mine, quarry (M.)(CDIAL 3813); cf. khana = a trench, a pit, a hollow in the ground (Santali.lex.)].

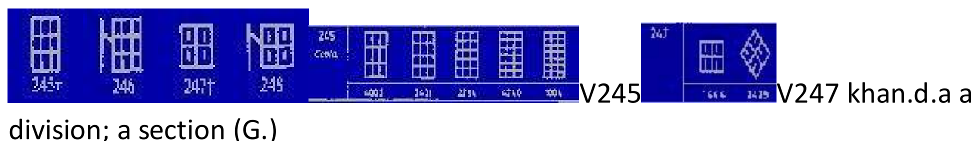

V342

Glyph: rim of pot: **kanna_** edge, handle, rim (H.); **ka_nu** end of a rope for supporting a burden (N.); **karn.a** = the handle or ear of a vessel (RV 8.72.12; S'Br. 9); the helm or rudder of a ship; **karn.aka** = a prominence on handle or projection on the side or sides of a vessel [*kan-* (Santali) < *karn.a* (RV)]; **karn.akita** = having handles, furnished with tendrils (Skt.lex.) karn.a = ear, handle of a vessel (Rv.); end, tip (RV 2.34.3); kan.n.a ear, angle, tip (Pali)(CDIAL 2830). kan.n.aka = having ears or corners (Pali); **kan.o** = rim, border (S.); **ka_n.a_** brim of a cup (B.)(CDIAL 2831). **kankha, kan:kha, khan:kha** = rim of a vessel; khan:kha habic perejme, fill it up to the brim; kan:khi = the rim of a vessel (Santali.lex.) **kan.d.a kan:kha, kan.d.a kankha** = the rim of a waterpot (Santali.lex.) **kankha, kan:kha** = brow of a hill (Santali.lex.)

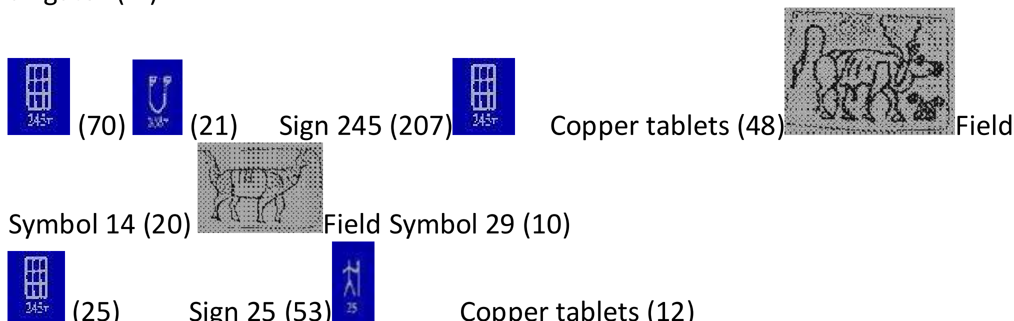
kankha, kan.d.a kankha = brim, rim of a vessel (Santali); ka~kh; kanna_ (H.)(Santali.lex.Bodding) kan.t.u = the rim of a vessel (Ka.lex.) kan.d.a = an earthenware pot (having a neck a little longer than that of a t.hili, but otherwise of about the same shape as this, only somewhat larger; ghar.a kan.d.a = a waterpot of brass (Santali.lex.Bodding)

kankha = rim. The orthographic focus of this most frequently occurring glyph is clearly intended to denote the rim or handle of the short-necked jar – to be distinguished, for example, from a wide-mouthed pot without a rim.

khan.d.i_ = ivory in rough (Jat.ki_)

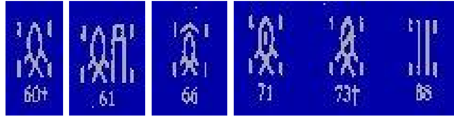

V245 V247 khan.d.a a division; a section (G.)

gha~_t. = protuberance of snout of alligator (A.) gan.d.e (Te.) gha~r.iya_l (A.B.); ghar.ya_lu = long-nosed porpoise (S.); gha~t. = protuberance on the snout of an alligator (A.)


(70) (21) Sign 245 (207) Copper tablets (48) Field Symbol 14 (20) Field Symbol 29 (10)

(25) Sign 25 (53) Copper tablets (12)

Pairing glyph: nine divisions; lo ‘nine’ (Santali) rebus: loh ‘iron, metal’ (Skt.); khan.d.a ‘division’ (Skt.); kan.d. = furnace, altar (Santali) lokhan.d. ‘iron, ironware, tools’ (G.) lo + khan.d. = rebus: loh ‘iron’ + kan.d. ‘furnace, altar’ (Santali)

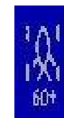


Signs using four short strokes to subscribe another glyph. gan.d.a ‘a set of four’; *gan.d.a gut.i* to divide, to make up an account (Santali) *gan.d.i* hole, orifice (Te.); *kan.d.i, gan.d.i* opening, hole, window (Tu.)(DEDR 1176). Rebus: kand. ‘altar, furnace’ (Santali)

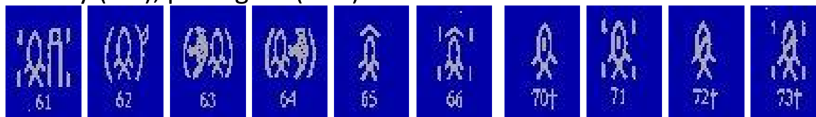




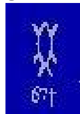
M375 m314

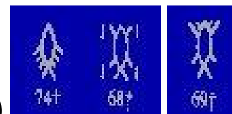


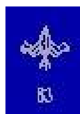
pon, ponea, ponon = four (Santali) Rebus: pon, hon = a gold coin, the half of a varaha (Ka.); honnu = gold (Ka.); ponnu (Te.); pon-, por- = metal, gold, luster, beauty (Ta.); pol = gold (Ma.)



Substantive: pit? *gan.d.i* hole, orifice (Te.); *kan.d.i, gan.d.i* opening, hole, window (Tu.)(DEDR 1176).
Glyph: *gan.d.e* ‘to place at a right angle to something else, cross, transverse’; *gan.d. gan.d.* ‘across, at right angles, transversely’ (Santali)



a~s = scales of fish (Santali) ayas = metal (RV) 
badhor. ‘a species of fish with many bones’ (Santali) Rebus: barduga = a man of acquirements, a proficient man (Ka.) bar.ae = a blacksmith; bar.ae kudlam = a country made hoe, in contrast to cala_ni kudlam, an imported hoe (Mundari)



Bat, flying-fox = vagguli (Pali), ba_vali, ba_voli (Tu.), va_til (Ma), vavva_l (Ta.) Bat = va_lgu.da (Skt.)

Rebus: **bha~wa~r, bha~ora** = a boring instrument resembling a brace (Santali) cf. bhramara turning (Skt.lex.)

A tribute to artisans who invented alloying and a writing system, ca. 4000 years ago

Indus script encodes mleccha speech (A quintet) -- URLs for the 5 volumes of Indus Script encodes mleccha speech:

http://www.scribd.com/doc/2231843/writing
http://www.scribd.com/doc/2231860/dictionary
http://www.scribd.com/doc/2232464/epigraphica
http://www.scribd.com/doc/2232534/language
http://www.scribd.com/doc/2232617/lexicon

Note: The book, titled: Indus script encodes mleccha speech, is in 5 volumes (including a CD for volume 5 of 5111 pages): can be obtained from Jayalakshmi Book Stores, 6 Apparsami Koil St., Mylapore, Chennai Tel. 91 44 24990539
jibh_rkc@hotmail.com

This is a tribute to ancient artisans. Two revolutionary civilizational discoveries occurred in the 3rd millennium BCE: one was the technique of alloying metals and the second was the invention of a writing system.

The work in 5 volumes, *Indus script encodes mleccha speech* proves the validity of the insight provided by Prof. James D. Muhly: "The Early Bronze Age of the 3rd millennium B.C. saw the first development of a truly international age of metallurgy... The question is, of course, why all this took place in the 3rd millennium B.C... It seems to me that any attempt to explain why things suddenly took off about 3000 B.C. has to explain the most important development, the birth of the art of writing... As for the concept of a Bronze Age one of the most significant events in the 3rd millennium was the development of true tin-bronze alongside an arsenical alloy of copper...” (J.D. Muhly, 1973, Copper and Tin, Conn.: Archon., Hamden; Transactions of Connecticut Academy of Arts and Sciences, vol. 43) p. 221f.) The emergence of the Iron Age (c. 1000 BCE)…’The simplicity of iron-working took metallurgy out of the palace, just as the alphabet had done for the art of writing.’ [James D. Muhly, Mining and metalwork in ancient Western Asia, p. 1517 in: Jack M. Sasson, ed., 1995, Civilizations of the ancient Near East, New York, Charles Scribner’s Sons, pp. 1501-1521]."The fabrication of bronze represented man's first industrial revolution centering in the use of fire...” ." (Theodore A. Wertime, The search for ancient tin: the geographic and historic boundaries, in: Alan D. Franklin, Jacqueline S. Olin and Theodore A. Wertime, eds., 1977, The Search for Ancient Tin, Washington D.C., US Government Printing Office; See Theodore W. Wertime, In search of Ana_ku, bronze-age mystery, Mid-East 8, May-June 1968, pp. 10-20; J.D. Muhly, Tin trade routes of the bronze age, American Scientist 61, July-August 1973, pp. 403-13).

The artisans of Sarasvati civilization have provided the basis for the following examples of civilizational continuities:

Glyphs on early cylinder seals of Mesopotamia (Akkadia, Susa, Elam, Anau)

Glyphs on Gundestrup cauldron
Glyphs on punch-marked coins of Asia-minor and janapada-s extending from Gandhara to Karur (on the banks of Kaveri) and in Srilanka
Glyph s'rivatsa on Sanchi torana; glyph of kaula mengro on Barhut stupa (alligator ligatured to a mollusk)
Rock-cut reservoir in Vidisha, grand anicut (kallanai on Kaveri) comparable to rock-cut reservoir of Dholavira and gabar bands on Sindhu
Glyphs of Sohgaura copper plate
Glyphs on tin ingots discovered in a ship-wreck near Haifa
Use of lost-wax (cire perdue) technique for pancaloha (five-metal alloy) sculpture-making in Swamimalai (comparable to the technique used in Sarasvati civilization)

The mleccha-speaking artisans invented alloying of metals and a writing system. Both are related as validated in the insightful, falsifiable hypothesis stated by Prof. James D. Muhly. This is thus a tribute to savants like Muhly and to the artisans of yore who have been harbingers of the industrial age, changing the lives of people for ever.

http://sarasvati97.blogspot.com/2008/03/httpwww.html
Abhidha_na Cinta_man.i of Hemachandra states that mleccha, mlecchas'a_varabheda_khyam and mleccha-mukha are three of the twelve names for copper: ta_mram (IV.105-6: ta_mram **mlecchamukham** s'ulvam rakt tam dvas.t.amudumbaram; **mlecchas'a_varabheda_khyam** markata_syam kani_yasam; brahmavarddhanam varis.t.ham si_santu si_sapatrakam).

Theraga_tha_ in Pali refers to a banner which was dyed the colour of copper: **milakkhurajanam** (The Thera andTheriga_tha_, PTS, verse 965: **milakkhurajanam** rattam garahanta_ sakam dhajam; tithiya_nam dhajam keci dha_ressanty avada_takam; K.R.Norman, tr., Theraga_tha_: Finding fault with their own banner which is dyed the colour of copper, some will wear the white banner of sectarians).[cf. Asko and Simo Parpola, On the relationship of the Sumerian Toponym Meluhha and Sanskrit Mleccha, *Studia Orientalia,* vol. 46, 1975, pp. 205-38).

Reading : eraka + ad.aruni + bed.a hako + kolli + kan.d.a kan-ka Message (rebus) : eraka 'copper' ; aduru 'native metal' ; bed.a 'either end of hearth' ; hako, ayo, ayas, 'metal'

A Sarasvati (Indus) seal on auction : possessions of a miner (khanaka) - smith (kamar)

-- (Addenda : *Indus script encodes mleccha speech* This work demonstrates two encoded, most frequent hieroglyphs in the writing system: khanaka, karn.aka 'rim of jar'; kamar-saala 'pannier'; the two words read, respectively, rebus: miner, smith-workshop. Another homograph glyph related to kamar is 'antelope or tiger looking back'; the word is krammara 'looking back'; rebus kamar 'smith', karma_ra, kamma_l.an, kamma).

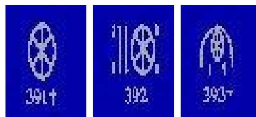




Reading : eraka + ad.aruni + bed.a hako + kolli + kan.d.a kan-ka
Message (rebus) : eraka 'copper' ; aduru 'native metal' ; bed.a 'either end of hearth' ; hako, ayo 'ayas, metal' ; kan.d.a 'furnace, fire-altar' ; khanaka 'miner'. The possesions listed on this seal, therefore, are : furnace at mine-pit, hearth for metal ; copper native metal.

Indus seal on auction (March 2008); Heritage auction galleries

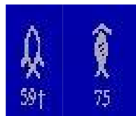
Link for the ongoing auction:
http://historical.ha.com/common/view_item.php?Sale_No=6005&Lot_No=98052



era, erako 'nave of wheel'; erako_lu the iron axle of a carriage (Ka.) rebus: eraka, er-aka any metal infusion (Ka.Tu.) ara_ 'spokes'; rebus: ara 'copper' (Akkadian); araka 'copper' (Ka.)

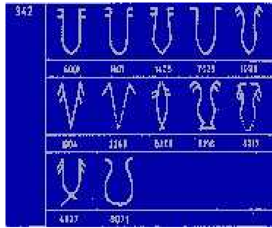
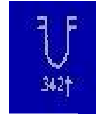
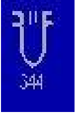


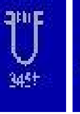
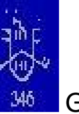
at.ar a splinter; *at.aruka* to burst, crack, slit off, fly open; *at.arcca* splitting, a crack; *at.arttuka* to split, tear off, open (an oyster)(Ma.); *ad.aruni* to crack (Tu.)(DEDR 66) Rebus: aduru 'native metal' (Ka.) Vikalpa: badhi 'splinter'; rebus: badhi 'worker in iron and wood'.



bed.a hako 'fish' (Santali) Rebus: bed.a 'either of the sides of a hearth' (G.) [Early form of hako is 'ayo'; rebus: ayas 'metal']

kolli = a fish (Ma.); koleji id. (Tu.)(DEDR 2139). ko_la_ flying fish, exocaetus, garfish, belone (Ta.) ko_la_n, ko_li needle-fish (Ma.)(DEDR 2241). kollan 'smith' ; kol 'panchaloha or alloy of five metals' (Ta.)

  V342  

Glyph of ‘rim of jar’ kan.d.a kan-ka may denote fire altar, furnace and also metal implements (or, more precisely, furnace/altar for making metal implements).

khan.n.a = that which is dug (Pkt.lex.) **khana** = a trench, a pit, a hollow in the ground (Santali.lex.) [**khan** = a mine (Santali) ?khani = mine (VarBr.S.); khan.i = mine (Pkt.); khani (A.); khan (H.); khan. = mine, quarry (M.)(CDIAL 3813); cf. khana = a trench, a pit, a hollow in the ground (Santali.lex.)].
http://sarasvati97.blogspot.com/2008/03/ageless-tale-of-bhirrana-potsherd.html
The ageless tale of a Bhirrana potsherd; dance as a hieroglyph
Why is a 'dancing girl' glyph shown on a potsherd discovered at Bhirrana?
Dancers are depicted as hieroglyphs on a tablet m0493 as shown below.
http://tinyurl.com/2wnp5w m0493Bt Pict-93: Three dancing figures in a row.
Text 2843

Glyph: Three dancers. Kolmo ‘three’; meD ‘to dance’
Rebus: kolami ‘furnace, smithy’; meD ‘iron’
So, why a dancing girl? Because, depiction of a dance pose is a hieroglyph to represent what was contained in the pot. The glyph encodes the mleccha word for 'iron': med.
Glyph: meD 'to dance' [reduplicated from me-] (F.); me id. (M.) in Remo (Munda) (Source: D. Stampe's Munda etyma) **me��u** to tread, trample, crush under foot, tread or place the foot upon (Te.); **me��u** step (Ga.); **mettunga** steps (Ga.). **ma�ye** to trample, tread (Malt.)(DEDR 5057)



T.S. Subramanian
— Photo: ASI
sequence: The “Dancing Girl”
http://tinyurl.com/ytoolk
CHENNAI: In a rare discovery, the Archaeological Survey of India has found at Bhirrana, a Harappan site in Fatehabad district in Haryana, a red potsherd with an engraving that resembles the ‘Dancing Girl,’ the iconic bronze figurine of Mohenjodaro. While the bronze was discovered in the early 1920s, the potsherd with the engraving was discovered during excavations by the ASI in 2004-05.
A few hundred kilometres separate Mohenjodaro, now in Pakistan, and Bhirrana. The potsherd, discovered by a team led by L.S. Rao, Superintending Archaeologist, Excavation Branch, ASI, Nagpur, belonged to the Mature Harappan period. Mr. Rao called it the “only one of its kind” because “no parallel to the Dancing Girl, in bronze or any other medium, was known” until the latest find.

In an article in the latest issue of *Man and Environment* (Volume XXXII, No.1, 2007), published by the Indian Society for Prehistoric and Quaternary Studies, Pune, Mr. Rao says, "... the delineation [of the lines in the potsher d] is so true to the stance, including the disposition of the hands, of the bronze that it appears that the craftsman of Bhirrana had first-hand knowledge of the former."
In his article, Mr. Rao has said the bronze was justly known for its stance and workmanship. "With its tilted head, flexed legs, right hand resting on the hip and the left suspended by its side, the bronze sculpture, although nude, enjoys a modest ornamentation with a necklace, wristlets and armlets. A statuette of 11 cm in height, it occupies a unique position in the sculptural art of the Mature Harappan period."



The potsherd with the engraving.
http://tinyurl.com/2bzftc

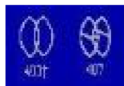
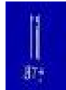
Mr. Rao called the engraving on the potsherd "a highly stylised figure whose torso resembles that of an hour-glass or two triangles meeting at their apex." Upon the horizontal shoulder line, a partly damaged round head was visible. In consonance with the bronze, "here too, the right hand is akimbo, and the left is suspended by its side. Slight oblique strokes on the right upper arm are suggestive of the presence of armlets. The lower portion of the body is missing owing to damage on the sherd. The clothing is indicated by horizontal hatchings on the chest and abdomen, and vertical hatchings on the thighs."
Mr. Rao called Bhirrana an "exemplary" and "paradigmatic" site that stood out on two more grounds. For the first time in the post-Independence period, artefacts called Hakra ware, belonging to the pre-early Harappan period, were found as independent, stratified deposits at Bhirrana. This and other discoveries established the presence of an unbroken cultural sequence at Bhirrana: from the Hakra ware culture and its evolution into early Harappan, early Mature Harappan and Mature Harappan until the site was abandoned.
The discoveries of these periods include underground dwelling pits; house-complexes on streets; a fortification wall; bichrome pottery; terracotta cups; arrowheads, fish-hooks and bangles, all in copper; incised copper celts; terracotta toy-carts and animal figurines; and beads of semi-precious stones.
Seals made of steatite of the Mature Harappan period were found. They have animal figures such as a unicorn, a deer with wavy antlers, a bull with outsized horns, and an animal with three heads — of a deer, a unicorn and a bull. The seals also have typical Harappan legends on them. All these were found during excavations in 2003-04, 2004-05 and 2005-06.
Mr. Rao and colleagues have written on their work in *Puratattva* (Nos. 34, 35 and 36), a bulletin of the Indian Archaeological Society.
http://www.hindu.com/2007/09/12/stories/2007091255372200.htm



h182A h182B

4306Tablet in bas-relief
h182a Pict-107: Drummer and a tiger. h182b Five svastika signs alternating right- and left-handed. har609 terracotta tablet, bas-relief [The drummer is also shown on h182B tablet with a comparable epigraph and five svastika glyphs alternating right- and left-handed arms.]

The text 4306:

Glyph**: cur.i** a bracelet, a bangle (Santali)
Glyph: millstone: **san:ghat.i** = a millstone, that crushes (Ka.)
Rebus: **cu_l.ai**, 'kiln' (Ta.) **culli** = a fireplace (Ka.)
Rebus: **saghad.i_** = furnace (G.)
 (34)  (21)

Glyph: *mandar.i, mandar.ia* 'a drummer, drum musicians' (Santali) [The hieroglyph of 'drummer' is shown on the same tablet which depicts 5 svastika obverse of the tablet; the text is the same on both sides of the tablet.]

Rebus: mo_ti_kha_ne = the commissariat department of an army (Ka.); **mo_di_** (M.H.); a granary (Ka.lex.)

Vikalpa: *man.d.ao* 'to occupy a new house, to take up one's residence'; *man.d.hwa, man.d.ua, man.d.wa* 'a temporary shed or booth erected on the occasion of a marriage'; *man.d.om* 'a raised platform or scaffold'; *ma~r.om* 'a platform, used to keep straw on, or from which to watch crops' (Santali) *mandar* 'the headman of a village'; *man.d.wari* 'the Marwari caste of hindus' ***Ko.*** **man�** Toda mund (i.e. village); burning place for dry funeral; **mandm (*obl.* mandt-)** meeting. ***To.*** **mo� (*obl.* mo�t-)** locus of tribal activity, including village with dairy, dairy apart from village, and funeral place; patrilineal clan. ***Ka.*** **mandu** hamlet of the Todas on the Nilagiri. ***Ko�.*** **mandï** village green; ***Ta.*** **ma��u** hall of assembly, golden hall of Chidambaram, court of justice, arbitration court, cow-stall, herd of cows, raised platform under a tree for village meetings, centre of a garden, junction of four roads or streets (DEDR 4777).

Glyph: mo~r.e 'five' (Munda etyma)

sattva 'svastika glyph'; rebus: jasta, yasada, sattva 'zinc'
mo~r.e 'five (count)'; rebus: man.d.ua 'booth, shed'

mo~r.e~ = five (Santali. lex.)

Stump, stubble

mud.d.ha_ = shoulder (H.); mu_d.ha_ lump, hump, shoulder (H.); mun.d.a_ lump (Or.)(CDIAL 10189).

mo_t.abari = a pack bullock; mo_t.abariva_n.d.ru = pl. pack pedlars (Te.lex.)

mor.a_ = wicker stool (B.Or.); mod.a_ (M.); mura_ (A.); mor.ha_ (H.); mor.ha_, mur.a_ (N.)(CDIAL 10352) [Note the stool or platform on which a seated person in yogic posture is shown].

mod.avum = to twist, to turn, to bend (G.lex.)

mut.h = tree (Dm.); **mut.ha** (Gaw.); **mut.h** (Kal.Phal.); mut.hiya_, mut.ha_l, mut.hail bullock with stunted horns (Bi.); mud.ha_ stubble, stump (OA.); mura_ (A.); mun.d.ur stump (L.); mun.d.h, mud.d.h = stem; mun.d.hi_ stump of a plant (L.); mo_~t.huru = bare trunk of a tree (K.)(CDIAL 10187). **mundu_** tree-trunk (Orm.); pl. mundu_ni stump or bole of tree, maize stubble (Sh.)(CDIAL 10196). **mo_d.u** = a stump; raised or high ground; mo_t.u = a stump; a human figure (made of wood) fixed in the path of a boar to entice it (Te.lex.) mun.d.ha, mun.d.hak = stump of tree, log (Santali.lex.) mo_t.u = the stump of a tree, stubbles (Ka.); mo_t.u, mo_d.u (Te.); murad.u (Ta.); stump of a tree; that of the arm or leg (Ma.); mu_r-ai = a stump (Ta.); mu_le cattle without horns or with horns turned (Ma.)(Ka.lex.)

mut.t.u tool, instrument, sundry things; mut.ga.rn Kota economic associate with Badaga or with Kurumba (he gives tool etc.); Kota economic associate with Toda (less formal than kel. Relationship)(Ko.); mut. Things given by Kotas to Toads, including tools (To.); mut.t.u implement, tool, thing, utensils, furniture, things belonging to a house as beams (Ka.); instrument, tool (Te.)(DEDR 4937). tat.t.tumut.t.u furniture, goods and chattels, utensils, luggag (Ta.); kitchen utensils, household stuff (Ma.); tat.t.imut.t.u id. (Tu.)(DEDR 3041).

mo_d.i = the mor or common business script of the Mara_thi (Ka.); mo_d.i_, mo_d.u (M.); a running hand (Ka.)(Ka.lex.)

modi_ = a steward; a grain-dealer, a retail grocer; modi_kha_num = a granary; the commissariat department; the business of supplying corn and other provisions (G.lex.) modaliga = a chief, a headman (na_ga, mukhya)(Ka.lex.) mo_di_ = a purveyor, caterer, victualer, grocer (Te.lex.) **mudi** = a shopkeeper, a Hindu caste (Santali.lex.) mo_d.i = a turn, a caste, a style, a fashion (of speech, composition, action)(Ka.M.Te.Ma.) **mo_ti** = a corn handler; a petty grocer (Ka.); mo_di_ (M.H.); mo_ti_kha_ne = the commissariat department of an army (Ka.); **mo_di_** (M.H.); a granary (Ka.lex.)

 h182A  h18/2B 

4306Tablet in bas-relief h182a Pict-107: Drummer and a tiger. h182b Five svastika signs alternating right- and left-handed.

mo~r.eko, mo~r.eko turuiko = certain Santal godlets so named (Santali.lex.) [Note the depiction of six (**turui**) persons with twigs on their heads and with pigtails].

mon.d. = the tail of a serpent; jambr.o mon.d. = the tail of the rock snake (Santali.lex.) [The glyph is ligatured to the composite animal in lieu of a tail].

mahri, mudi = a shopkeeper, a Hindu caste (Santali) maru hor.o = a brave man (Mundari.lex)

mahra, mahara = a small insect found in water (Mundari) **maru** = adj. Of reptiles, small mammals, and fish (not crabs, for which ora is used)(Mundari) sen:gel marmar = a species of centipede, scolapendra versicolor; a poisonous centipede, verhy common; the sting is painful like that of a scorpion (Santali.Mundari.Ho.); kar.kommarmar = a scorpion (Mundari.lex.)

marmar = marble (Mundari.H.)

mahra, mahara = a hindu caste, the goalla or cow-keeping caste (Mundari)

martul, martol = a sledge-hammer as used to break rocks or stones (Mundari.Santali); martul (fr. French marteau)(H.)(Mundari.lex.)

The hieroglyph showing five svastika: zinc-shed or zinc-granary.

[quote] In the Rasaratnasamuchhaya a very famous Indian text on alchemy composed in 13AD, mentions many ancient Indian(pre christian era) alchemists like Nagarjuna, Govinda. It also mentions many ancient types of instruments, furnaces, bellows, retorts for extracting the metals from the ores and smelting. The Tirakpatana yantram (distillation by descending machine) was used for distillation purposes. It also mentions an ancient zinc production factory at Zawar(Rajahstan; located 24° 21' N; 73° 41'E) and situated about 40km of Udaipur. In the early 1980's it was excavated and studied by the British Museum, MS university and Hindustan Zick limited. Zinc smelting was done in small cylindrical retorts (about 30 cm long and 10 cm in diameter) and the vapour was distilled from the charged retorts by placing them in the furnace in a vertically inverted position. The furnaces were found in two parts consisting of a zinc vapour condensation chamber at the bottom and a furnace chamber at the top. These are separated by a perforated terracotta plate measuring 65 X 65 X 20cm. As many as 36 charged retorts were arranged inverted vertically on the perforated plate. From the condensation funnel tubes, luted with retorts, which were inserted through the perforated plate, zinc vapour was collected in vessels in the lower chamber and condensed.

High quality zinc alloys and zinc sheets have been found in ancient India. At Pratkashe, two copper objects containing 25.86 and 17.75% ink has been found in 2000BC. In the prehistoric Harappan civilisation copper bronze artefacts to 6% zinc were found.

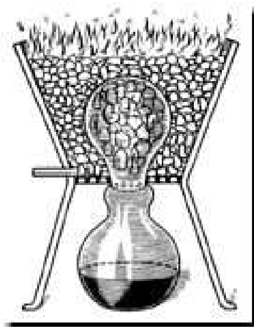
About 20 miles north of Rawalpindi of modern Pakistan, brass objects(two bangles, one vase and pot) dated to around 300BC contained 34.34% of zinc. A chariot found in the lost city of Dwarika(4000-6000BC) contained 10.68% zinc. Similarly, scores of brass items of items of Buddha, coins and caskets had some 17-25% zinc.

In fact an entire roll of sheet zinc at Agora in Athens in 300-400BC was found. And the Greeks were not producing zinc, and as we have ample evidence that it was produced in India, it can only be assumed they obtained these sheets from India. [unquote]

http://www.abovetopsecret.com/forum/thread111071/pg7

Discovering the 8th metal A history of Zinc
Fathi Habashi

History of Zinc



Centuries before zinc was discovered in the metallic form, its ores were used for making brass and zinc compounds were used for healing wounds and sore eyes. Although the word brass frequently occurs in the Old Testament, there is little evidence that an alloy of zinc and copper was known in early times. The word translated "brass" might equally well be rendered bronze or copper, both of which were in common use.

Figure1: Schematic representation of the Indian method for producing zinc.

In the latter part of the thirteenth century, Marco Polo described the manufacture of zinc oxide in Persia and how the Persians prepared tutia (a solution of zinc vitriol) for healing sore eyes.

The Roman writer Strabo (66 B.C. - 24 A.D.) mentioned in his writings that only the Cyprian ore contained "the cadmian stones, copper vitriol, and tutty," that is to say, the constituents from which brass can be made. It is believed that the Romans first made brass in the time of Augustus (20 B.C. to 14 A.D.) by heating a mixture of powdered calamine, charcoal and granules of copper. Roman writers observed that coins made from orichalcum were undistinguished from gold.

Zinc in India

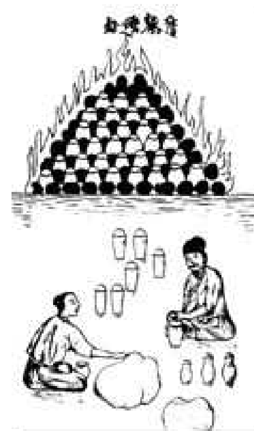
The production of metallic zinc was described in the Hindu book Rasarnava which was written around 1200 A.D. The fourteenth century Hindu work Rasaratnassamuchchaya describes how the new "tin-like" metal was made by indirectly heating calamine with organic matter in a covered crucible fitted with a condenser. Zinc vapour was evolved and the vapour was air cooled in the condenser located below the refractory crucible (Figure 1). By 1374, the Hindus had recognized that zinc was a new metal, the eighth known to man at that time, and a limited amount of commercial zinc production was underway.

At Zawar, in Rajasthan, great heaps of small retorts bear testimony to extensive zinc production from the twelfth to the sixteenth centuries. The tubular retorts are about

25 cm long and 15 cm in diameter with walls about 1 cm thick. A small diameter tube was sealed onto the open end and the zinc vapours likely condensed in this. The retorts were closely spaced in a furnace which was probably heated with charcoal fanned by bellows. Both zinc metal and zinc oxide were produced. Zinc was used to make brass whereas the oxide was used medicinally. Over 130,000 tons of residue remain at Zawar and this represents the extraction of the equivalent of 1,000,000 tons of metallic zinc and zinc oxide.







Zinc in China

Figure 2: The Chinese learned about zinc production sometime around 1600 A.D.

From India, zinc manufacture moved to China where it developed as an industry to supply the needs of brass manufacture. The Chinese apparently learned about zinc production sometime around 1600 A.D. An encyclopedia issued in the latter half of the sixteenth century makes no mention of zinc, but the book Tien-kong-kai-ou published early in the 17th century related a procedure for zinc manufacture. Calamine ore, mixed with powdered charcoal, was placed in clay jars and heated to evolve zinc vapour. The crucibles are piled up in a pyramid with lump coal between them (Figure 2), and, after being brought to redness, are cooled and broken. The metal is found in the center in the form of a round regulus. Zinc production expanded and metal began to be exported.

Zinc in Europe

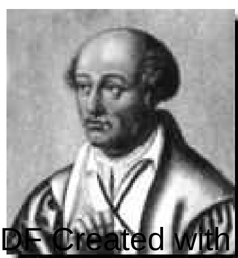
Figure 3: Albertus Magnus described the production of brass.

Albertus Magnus (Figure 3) (ca. 1248) described how either calamine or furnace tutty might be used to colour copper gold. He suggested that a more golden lustre might be obtained by sprinkling crushed glass on top of the mixture in the crucible to form a slag which would help prevent the escape of the zinc vapour; in other words, increase the zinc content of the brass.

Biringuccio (ca. 1540) has the next most complete description of brass making. He described how either calamine or furnace tutty could be mixed with broken up pieces of copper and sprinkled with a layer of powdered glass, then heated in a closed crucible for 24 hours.

Figure 4: Georgius Agricola (1490-1555) observed in 1546 that a metal called "zincum" was being produced in Silesia.

Agricola (Figure 4) in 1546 reported that a white metal was condensed and scraped off the walls of the furnace when Rammelsberg ore was smelted in the Harz Mountains to obtain lead and silver to which he gave the name "contrefey" because it was used to imitate gold. This often consisted to metallic zinc, although he did not recognize it as such. He observed, furthermore, that a similar metal called "zincum" was being produced under similar circumstances in Silesia by the local people. Paracelsus (1493-



1541) (Figure 5) was the first European to state clearly that "zincum" was a new metal and that it had properties distinct from other known metals.

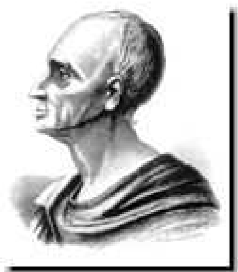


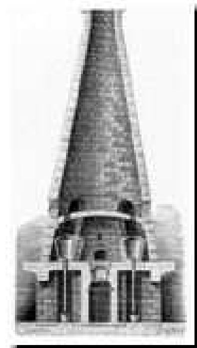
Figure 5: Paracelsus (1493-1541) was the first European to state clearly that "zincum" was a new metal.

Thus, by about 1600, European scientists were aware of the existence of zinc. All the metal they had examined, however, had likely been imported from the East by Portuguese, Dutch and Arab traders. However, there was a profusion of names quite unrelated to the local names for zinc ores. These included tutenag (derived from the Persian tutiya, calamine,which became the English tutty, zinc oxide) and spelter (likely from the similar coloured lead-tin alloy, pewter, or the Dutch equivalent, spiauter or Indian tin which the British scientist Robert Boyle latinised to speltrum in 1690 from which originates spelter, the commercial term for zinc. The word tutia, an old name for zinc oxide, is derived from a Persian word that means smoke and refers to the fact that zinc oxide is evolved as white smoke when zinc ores are roasted with charcoal.

In Renaissance times, latten (or laten, laton, lattyn) became the common English word for brass, akin to the French laiton (= brass) and Italian latta (= sheet brass), and probably based on the Latin latte or lathe (= sheet). The origins of the German word for brass, Messing, may be related to the Latin massa (= lump of metal). The modern English brass may be related to the French braser (= braze or solder). The word "zinc" may be derived from the Persian word sing meaning stone. In Arabic, zinc is known as kharseen, i.e. Khar from Al-Ghar = mine, seen from Al-Seen = China, hence kharseen, the metal from Chinese mines. The spelter trade with the East flourished throughout the seventeenth and first half of the eighteenth centuries, although there seem to be no records concerning the tonnages involved.

Figure 6: Andreas Marggraf (1709-1782) fully described the production of zinc from calamine.

In an extensive research "On the method of extracting zinc from its true mineral, calamine", Andreas Marggraf (Figure 6) in 1746 reduced calamine from Poland, England, Breslau and Hungary with carbon in closed retorts and obtained metallic zinc from all of them. He described his method in detail, thereby establishing the basic theory of zinc production. Marggraf also showed that the lead ores from Rammelsberg contained zinc and that zinc can be prepared from sphalerite. Marggraf was probably unaware that in 1742, the Swedish chemist Anton von Swab (1703-1768) had distilled zinc from calamine and that, two years later, he had even prepared it from blende. Since the vapors rose to the top of the alembic before passing into the receiver, this process was called distillation per ascendum. In 1752 Swab and another Swedish chemist Axel Fredrik Cronstedt (1722-1765) developed at government expense the use of Swedish zinc ores for the manufacture of brass, to avoid the necessity of importing calamine.



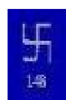
The knowledge of deliberate zinc smelting in a retort was acquired by an Englishman on a visit to China just prior to 1740. A vertical retort procedure was developed by William Champion (1709-1789) and by 1743 a zinc smelter had been established at Bristol in the United Kingdom. A charge of calamine and carbon was sealed into a clay crucible having a hole in the bottom. This was luted onto an iron tube extending below the crucible furnace into a cool chamber

below. The closed end of the iron tube sat in a tub of water and it was here that the metallic zinc was collected (Figure 7). The distillation took a total of about 70 hours to yield 400 kg of metal from all 6 crucibles positioned in the furnace. An annual production rate of 200 tons has been suggested for the works at that time.
Figure 7: William Champion's zinc smelting furnace.
This type of apparatus continued to be employed until 1851 although it was fuel inefficient, consuming 24 tons of coal for every ton of spelter produced. In 1758, William's brother, John, patented the calcination of zinc sulfide to oxide for use in the retort process, thereby laying the foundation for the commercial zinc practice which continued well into the twentieth century. The English zinc industry was concentrated in Bristol and Swansea.
The Welsh process was a batch operation which required withdrawing the crucible and retort after each cycle. It was labour intensive and fuel inefficient. A major technological improvement came with the development of the German process by Johann Ruberg (1751-1807) who built the first zinc smelting works in Wessola in Upper Silesia in 1798 which used the horizontal retort process developed by him. The principal advantage of this technique is that the retorts were fixed horizontally into the furnace allowing them to be charged and discharged without cooling. By placing the retorts in large banks, fuel efficiency was greatly increased. The raw material initially used was zinc galmei (calamine), a by-product of lead and silver production. Later, it became possible to produce zinc directly from smithsonite, an easily smelted ore. This was shortly followed by the use of zinc blende, which had first to be converted into the oxide by roasting. After this development, other smelting works were soon erected in Silesia near the deposits, in the areas around Liège in Belgium, in Aachen, in the Rhineland and Ruhr regions in Germany.
The first Belgian plant was built by Jean-Jacques Daniel Dony (1759-1819) in 1805 and also used horizontal retorts but of slightly different design. A larger plant was built in 1810. This was the predecessor of the Societé de la Vieille Montagne which a few years later became the largest zinc producing company in the world.
Zinc production in the United States started in 1850 using the Belgium process and soon became the largest in the world. In 1907, world production was 737,500 tons of which the USA contributed 31%, Germany 28%, Belgium 21%, United Kingdom 8%, and all other countries 12%.
The excellent resistance of zinc towards atmospheric corrosion soon led to its use in sheet production. The possibility of rolling zinc at 100-150¡C was discovered as early as 1805 and the first rolling mill was built in Belgium in 1812. More such mills were built in Silesia from 1821 onwards. Hot-dip galvanizing, the oldest anticorrosion process, was introduced in 1836 in France. This became possible on an industrial scale only after the development of effective processes for cleaning iron and steel surfaces. At first, only small workpieces were zinc coated. Continuous hot-dip galvanizing of semi-finished products and wire came later. In the United States, the rich ore deposits led to rapid growth in zinc production in 1840, so that by 1907, Germany, which had for long been the world's leading producer of zinc, was left behind.
Zinc was produced for about 500 years from its oxide ores which are far less abundant than the sulfides, before the sulfides became the major source of supply. The technology of zinc production changed gradually during the centuries towards a

more pyrometallurgical route. However, this tendency underwent a radical change during World War I when the roasting-leaching-electrowinning process was introduced and in the 1980's, when pressure leaching-electrowinning offered another practical route to zinc production.

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Reading svastika hieroglyph as zinc, zinc retort distillation furnace



This is an addendum to Sarasvati hieroglyph dictionary [http://www.scribd.com/doc/2231860/dictionary], presending notes on zinc (the metallurgical marvel to isolate and capture the eigth metal discovered with the invention by a stroke of genius, a brilliant zinc retort distillation furnace, which led to an astonishing enquiry in Indian alchemical traditions -- see the photograph of the retorts arrayed, displayed in an ancient mining site of Zawar, Rajasthan -- it's alchemy because copper could be made to shine like gold as aara-ku_t.a adding zinc to create the brass alloy) and svastika glyph (which occurs over 50 times on the Sarasvati epigraphs -- so-called Indus script). The svastika hieroglyph represents zinc, a zinc retort distillation furnace. The array of zinc retort distillation units displayed is comparable to the array of four or five 'svastika' glyphs which appear as Sarasvati hieroglyphs on Indus script inscriptions.


V391 V393

Sign 286 seems to ligature sign 267 and sign 391; Sign 355 seems to ligature sign 347 and sign 391 (Sign 391 depicts the opening in the nave or hub of wheel and also six spokes: **ara_**)



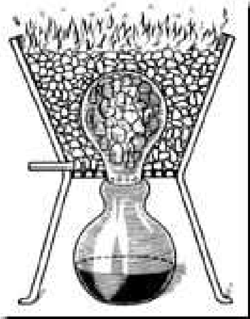
A ligature occurs on a Mohenjodaro seal, m0712:

m0712 1091 Note Sign391 ligatured on the animal's neck.

era, eraka = nave of wheel (Ka.); rebus: era, eraka 'copper' (Ka.) The glyph, 'nave of circle with six spokes': aara 'spokes'; eraka 'nave of wheel'; aara 'iron'; eraka 'copper'; ku_t.a 'summit of mountain'; ku_t.a 'mixing, alloy'. In historical times, brass gets called *pittal.a* which has an expanded semantic homonym: *pittala_t.t.am* See also uploaded my ebook on Indian alchemy. [http://www.scribd.com/doc/2268545/Soma1]No wonder, the vis'vakarma of Bharatam were able to create the wootz steel, the pancaloha murti-s from Swamimalai and also the Sanchi (now Delhi) iron pillar, apart from a hieroglyph, *s'rivatsa*, adorning a torana..



Zinc retort distillation furnaces, to add to copper to create the alloy, brass – corrosion-resistant, strong alloy, a fore-runner of the industrial revolution. Ancient zinc smelting site, Zawar mines, south of Udaipur.

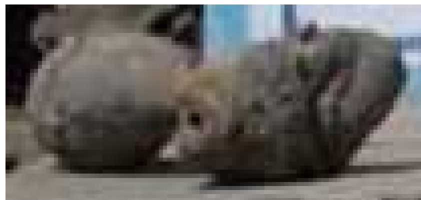


http://www.indogold.com.au/assets/images/photos/album/C7.jpg See lexemes: bakayantra ‘crane-instrument’; name of a particular retort ; ka_cabakayantra ‘a glass retort’ (Skt.) The cognate kancu, kamsya indicates the possibility of such a retort having been used to create distillates of metals using a retort furnace. Tiryakpa_tana ‘a kind of process applied esp. to mercury’; tiryakpa_tin ‘falling obliquely on (loc.) (S’is.X.40); tiryaksu_tra ‘a cross-line’; tiryakks.ipta ‘placed obliquely’ (Skt.) The prefix tiryak- may be derived from: S. *rimau* ‘to ooze’, *rimio* ‘leaky’, *rimrimi* f. ‘dripping’; L. *trimma* ‘to drop, distil, leak’, *trimmo* f. ‘leaking, distillation’. (CDIAL 6039). **āgrayaī—** f. ‘oblation of first fruits’ KātyŚr., *āgrayaá—* ‘the first soma libation at the Agnioma sacrifice’ VS.A. *āgani* ‘first distilled, strong’ (CDIAL 1052). s’ucy ‘to distil’; s’cut ‘to cause to drop or flow , shed S’Br.’ Pa_n. 7-4 , 61 Sch. Dha_tup. iii , 4 Dha_tup. xv , 6. a_su ‘to distil’ (RV 9.108.7) gad. ‘to distil or drop, run as a liquid’ (Dha_tup. 19.15); gad.ayati ‘to cover, hide’ (Dha_tup. 35,84).

asmadryaJc ‘turned towards us RV. vii , 19 , 10**’ kadryaJc ‘**turned towards what? RV. i , 164 , 17.**’nyaJc ‘**going or directed downwards , bent down’ RV. **tiryaJc** mfn. (fr.

{tiras} +{aJ} Pa_n. 6-3 , 94 ; nom. m. {-ryaG} n. {-ryak} f. {-raizcI} , also {-ryaJcI} Vop. iv , 12) going or lying crosswise or transversely or obliquely , oblique , transverse (opposed to {anv-aJc}) , horizontal (opposed to {Urdhva}) AV. VS. TS. &c. ; going across S'Br. xiv , 9 , 3 , 2 f. ; moving tortuously W. ; curved , crooked W. ; meandering W. ; lying in the middle or between (a tone) , xi , 4 , 2 , 5 ff. VPra1t. i , 149 ; m. n. `" going horizontally "' , an animal (amphibious animal , bird , &c.) Mn.v , 40 ; xii , 57 Yajn5. MBh. &c. [448,1] ; the organic world (including plants) Jain. ; n. = {-ryak-pramANa} S3ulbas. ; f. the female of any animal W. ; (%{rya4k}) ind. across , obliquely "' , transversely , horizontally , sideways S3Br. KatyS'r. SankhSr. VPrat. Mn. &c. ; ({-razcA4}) instr. ind. id. RV. i , 61 , 12 ; ii , 10 , 4 ; x , 70 , 4 ; ({-razci4}) loc. ind. id. S3Br. ii , 3 , 2 , 12 KatySr. xvii , 8 , 14 and 12 , 1. supratyaJc 'well turned back'; yadriyaJc 'moving or turning in which direction, reaching whither'; samyaJc 'turned together or in one direction'; pratyaJc 'moving in an opposite direction'. Br. KatySr; nyaJcita 'bent down'; paryaJc 'to turn about or round, revolve (RV 10.119.5)

These semantics indicate the possible reason for the invention of the glyph 'svastika' with two transverse arms (moving either clock-wise or anti-clockwise – both types of glyphs occur on Sarasvati hieroglyphs).



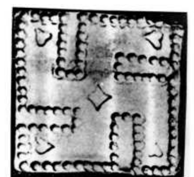
Zinc retort. Ancient smelting site mear Zawar mines, Rajasthan. Compare the retor distillation units shown at Zawar (in the above picture) with the following schematic of *tiryakpatana yantra* for distillation of zinc (*Rasaratnasamuccaya*). [quote] In the Rasaratnasamuchhaya a very famous Indian text on alchemy composed in 13AD, mentions many ancient Indian (pre christian era) alchemists like Nagarjuna, Govinda. It also mentions many ancient types of instruments, furnaces, bellows, retorts for extracting the metals from the ores and smelting. The Tirakpatana yantram(distillation by descending machine) was used for distillation purposes. It also mentions an ancient zinc production factory at Zawar(Rajahstan; located 24° 21' N; 73° 41'E) and situated about 40km of Udaipur. In the early 1980's it was excavated and studied by the British Museum, MS university and Hindustan Zick limited. Zinc smelting was done in small cylindrical retorts (about 30 cm long and 10 cm in diameter) and the vapour was distilled from the charged retorts by placing them in the furnace in a vertically inverted position. The furnaces were found in two parts consisting of a zinc vapour condensation chamber at the bottom and a furnace chamber at the top. These are separated by a perforated terracotta plate measuring 65 X 65 X 20cm. As many as 36 charged retorts were arranged inverted vertically on the perforated plate. From the condensation funnel tubes, luted with retorts, which were inserted through the perforated plate, zinc vapour was collected in vessels in the lower chamber and condensed.

Svastika_ symbol used in historical periods





Ancient coins of Bharat with svastikas, normal



and ogee (After Figs. 231 to 234 in Thomas Wilson, opcit). The coins were found by Cunningham at Behat near Shaharanpur. E. Thomas assigns them to about 330 BCE. (Edward Thomas**,** *Jour. Royal Asiatic Soc. (new series),* I, p. 175). The svastika sign does not appear in Indo-Bactrian (ca. 300 to 126 BCE), Indo-Sassanian (from 200 to 636 CE) or later Hindu or Mohammedan coins. The sign of svastika becomes an integral part of the temple architectural tradition and becomes a sacred symbol of the Hindu, Buddha and Jaina traditions.

Stone toilet tray, Sirkap, Taxila, Stratum II (pl. g = No. 246, Marshall);

Gold amulet, Svastika_, 1st cent. CE, Sirkap, Taxila (Pl. 191, No. 85, Marshall).

Copper seal, svastika_, Sirkap, Taxila, stratum II, legend indistinct, pl. 55 no. 27, Marshall).

BHIMBETKA	ROCK-SHELTER PAINTING
"	"
HARAPPA (HARAPPAN CULTURE)	SEAL + SEALING
MOHENJODARO (HARAPPAN CULTURE)	"
RANGPUR MALWA WARE (CHALCOLITHIC)	POTTERY
DIST. COORG DIST. COIMBATOR (MEGALITHIC)	"
PRAHLADPUR (SUB PERIOD I A) RUPAR (PERIO V)	SEAL + SEALING
TAXILA	DIFFERENT OBJECTS
BHAJA, KUDA, KARLE, JUNNAR NASIK	CAVE INSCRIPTION

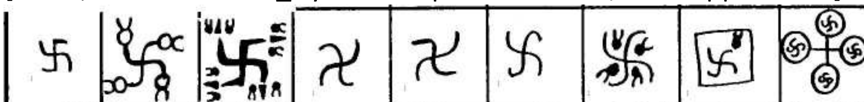
[Pl. 27, Svastika_ symbol: distribution in cultural periods]



[Pl. 28, A, Ramnagar, Lotapur, Mamdar, Singavaran: Punch-marked coins]

B	NAGARI FINDS.	,,			
C	KAUŚĀMBĪ	UNINSCRIBED + INSCRIBED CAST COPPER COINS			
D	KADA	COPPER COINS			
E	ERAN	COPPER PUNCH-MARKED COINS			

[Pl. 28, B to E: svastika_ symbol on punch-marked/cast copper coins]



[Pl.28, F: Ujjayini, copper coins with svastika_ symbol]

TAXILA	,,			
AYODHYA	,,			
ARJUNAYANA SIBIS KUNINDA KULUTA YAUDHEYA	,,			
SĀTAVĀHANA	COINS			

[Pl. 28, G to J, Taxila, Ayodhya, Arjunayana, Sibis, Kun.inda, Kuluta, yaudheya, S'a_tava_hana coins: Svastika_ symbol]

Standing male, dotted circles, portable furnace, Tree and Svastika, Elephant and Svastika glyphs on Srilanka punch-marked coins
Sri lanka ancient coins (Association of the svastika with a tree glyph or an elephant glyph can be traced back to the evidence from Sarasvati epigraphs (Indus script inscriptions):

Ancient Lanka - Tree and Svastika

Six Compartments - Right

A circular copper-lead coin with a six branched tree within enclosure of six compartments on obverse and a railed svastika revolving to right (clockwise) on the reverse.

SPECIFICATIONS
Alloy Cu-Pb?
Type Cast ?
Diameter 12.1 mm
Thickness 1.3 mm
Weight 0.77 gms



Shape Round
DieAxisO°

#

Obverse : A six branched tree within enclosure of six compartments in two rows of three each.
Reverse : A Railed *svastika* revolving to right (clockwise).
http://www.lakdiva.org/coins/ancient/tree06c_rsvastika.html

Ancient Lanka - Tree and Svastika

Eight Compartments - Left

A circular copper-lead coin with a Six branched tree within enclosure of Eight compartments on obverse and a railed svastika revolving to left (anticlockwise) on the reverse.

SPECIFICATIONS	
Alloy	Cu-Pb?
Type	Cast ?
Diameter	15.4 mm
Thickness	1.8 mm
Weight	1.9 gms
Shape	Round
DieAxis	O°



#

Obverse : A six branched tree within enclosure of eight compartments in two rows of four each in a dotted circular border.
Reverse : A Railed *svastika* revolving to left (anti-clockwise) in a dotted circular border.
http://www.lakdiva.org/coins/ancient/tree08c_lsvastika.html

Ancient Lanka - Tree and Svastika

Twelve Compartments - Left

A circular copper-lead coin with a four branched tree within enclosure of twelve compartments on obverse and a railed svastika revolving to left (anticlockwise) on the reverse.

SPECIFICATIONS

Alloy	Cu-Pb?
Type	Cast ?
Diameter	13.7 mm
Thickness	1.7 mm
Weight	1.02 gms
Shape	Round
DieAxis	O°



#

Obverse : A four branched tree within enclosure of twelve compartments in three rows of four each. The end of branch which is visible splits into three.
Reverse : A Railed *svastika* revolving to left (anti-clockwise). Unidentified symbols to left and right.
http://www.lakdiva.org/coins/ancient/tree12c_lsvastika.html

Ancient Lanka - Tree and Svastika
Twelve Compartments - Right

A large circular copper-lead coin with a four branched tree within enclosure of twelve compartments on obverse and a railed svastika revolving to right (clockwise) on the reverse.

SPECIFICATIONS

Alloy	Cu-Pb?
Type	Cast ?
Diameter	25.3 mm
Thickness	3. mm
Weight	5.82 gms
Shape	Round
Edge	Rough
DieAxis	180°



#

Obverse : A four branched tree within enclosure of twelve compartments in three rows of four each. The end of each branch splits into three leaves. Unidentified symbol to left and right.



Reverse : A Railed *svastika* revolving to right (clockwise). Unidentified symbol to left and right.

http://www.lakdiva.org/coins/ruhuna1/tree12c_rsvastika_bg.html
A tree and swastika coin



The reverse of the tree and swastika coin





An elephant and swastika coin

The reverse of the elephant and swastika coin

Anuradhapura - Elephant and Svastika

A fragment small rectangular(?) cast copper coin with a elephant standing facing right on obverse and a railed Svastika on the reverse. Found at various archaeological sites in Anuradhapura and Jaffna.
SPECIFICATIONS
Alloy Cu



Type Cast
Height 11.7 mm
Width 14.5 mm
Thickness 2.0 mm
Weight1.03 gms
Shape fragment
DieAxisO°

Codrington #10; OBRW H.21?
Obverse : Elephant standing facing right with trunk pendent, (in a single line frame).
Reverse : Railed Svastika revo;ving left (not very clear)

Bopearachchi and Wickremesinhe in *Ruhuna, An Ancient Civilization Re-visited* illustrates four copper coins from Akurugoda of similar type H.19 to H.22 (12-15 mm, 0.5-2.0 gms). http://www.lakdiva.org/coins/ancient/elephant_svastika_small.html
The circular Elephant and Svastika coins were mainly found at the Abhayagiri Dagoba in Anuradhapura. It is the Classic and largest of the ancient coins which is uniquely from Lanka.

All of the Elephant and Svastika coins illustrated in Parker; Codrington; Mitchiner; Seyone; Bopearachchi and Wickremesinhe have a prominant triple arch *Chitaya* symbol under the railed Svastika on reverse.



Obverse : Elephant walking to the left with trunk extended and tail ending in a triple fork (not visible). Above are four symbols

A	Just above Elephant	The *life* symbol -|<|
B	On Top	The Svastika revolving right (partly visible) mounted on a staff and surrounded by a railing indicated by four vertical lines rising from a horizontal line.
C	On upper left	Tree with three-Branches (not visible) each ending in a triple fork in a enclosure, divided into four compartments by a vertical and a horizontal line.
D	On upper right	*Chitaya* of three small cells, the two bottom ones are contiguous (off flan).
C	On lower right	Inverted Tree with three-Branches each ending in a triple fork in a enclosure, divided into four compartments by a vertical and a horizontal line.

Reverse : four symbols arranged

A	On Top	The railed Svastika revolving right.
B	Below	The usual *Chitaya* of three arches is **NOT seen** beneath a horizontal line. A number other distinct symbols with loops including a *Ankusa*(Elephant Goad).
C	To left	*Nandipada* symbol.

D	To right	The hour glass-like symbol i.e. O0E tilted, with triple-dot symbols on either end.

http://www.lakdiva.org/coins/ancient/elephant_svastika_struck.html
Century 3rd BC to 1st AD - Lanka
Ruhuna - Elephant and Svastika - Cast
The cast Elephant and Svastika coins are recent finds at Akurugoda near Tissmaharama in south east Lanka and are thick and rough casts. The thin and finely Struck coins of same type were mainly found at the Abhayagiri Dagoba in Anuradhapura. It is the Classic and largest of the ancient coins which is uniquely from Lanka.
SPECIFICATIONS



Alloy Copper
Type Cast
Diameter 30.7 mm
Thickness 3.2 mm
Weight 14.2 gms
Shape round
DieAxis O°

Obverse : Elephant walking to the left with trunk extended and tail ending in a triple fork, occupying the whole of the base. Above are four symbols

A	Just above Elephant	The *life* symbol |>|=
B	On Top	The Svastika revolving left or right mounted on a staff and surrounded by a railing indicated by four vertical lines rising from a horizontal line.
C	On upper left	Tree with three-Branches each ending in a triple fork in a enclosure, divided into four compartments by a vertical and a horizontal line.
D	On upper right	*Chitaya* of three cells, the two bottom ones are contiguous.

Reverse : four symbols arranged

A On Top The railed Svastika revolving left or right.

B	Below	*Chitaya* of three cells, the two bottom ones are divided by space, beneath a horizontal line.
C	To left	The hour glass symbol i.e. |>|<| upright.
D	To right	*Nandipada* symbol.

The description of seven these coins (H.1 to H.7) found in Akurugoda and cataloged in 1999 by Osmund Bopearachchi and Rajah Wickramasinhe in the book *Ruhuna. An Ancient Civilization Re-visited* .
http://www.lakdiva.org/coins/ruhuna/elephant_svastika_cast.html

Ruhuna - Lion and Svastika

The Lion and Svastika lead coins are rare recent finds at Akurugoda near Tissmaharama in south east Lanka.





SPECIFICATIONS

Alloy	Lead
Type	Cast
Diameter	16.4 mm
Thickness	3.5 mm
Weight	2.76 gms
Shape	round
Edge	rough
DieAxis	150°

Obverse : Lion jumping to the right with arched back and front legs stretched forward. Three heaped chitya below. Parts of few Brahmi text characters visble
Reverse : Railed svastika revolving to right (clockwise) at center of coin. Brahmi text characters visble all around periphery.
Ten lion and svastika lead coins (**E.1-E.10**) with sizes 7 to 25 mm and weights from 0.5 to 7 grams that were found in Akurugoda are cataloged in 1999 by Osmund Bopearachchi and Rajah Wickramasinhe in*Ruhuna. An Ancient Civilization Re-visited* .
http://www.lakdiva.org/coins/ruhuna1/ruhuna1_lion_svastika_pb.htm









Ancient clay stamp seals and sealings have

reportedly been found in Sri Lanka. http://www.freerepublic.com/focus/f-news/1074122/posts
http://www.cbsl.gov.lk/info/03_about/a_8.htm#1
http://swastika-info.com/en/startpage/srilanka/1067686584.html
Glyptic art themes which parallel the Sarasvati hieroglyphs are found on early punch-marked coins (Dilip Rajgor, 2001, Punch-marked coins of early Historic India, California, Reesha Books International) and on Pallava coins (R. Krishnamurthy, 2004, The Pallava Coins, Chennai, Garnet Publishers). Some of these themes are:



Svastika
The finds of Pallava coins at Dvaravati of Thailand also attest to the continuing maritime tradition which began with the Sarasvati civilization

High quality zinc alloys and zinc sheets have been found in ancient India. At Pratkashe, two copper objects containing 25.86 and 17.75% ink has been found in 2000BC. In the prehistoric Harappan civilisation copper bronze artefacts to 6% zinc were found.

About 20 miles north of Rawalpindi of modern Pakistan, brass objects(two bangles, one vase and pot) dated to around 300BC contained 34.34% of zinc. A chariot found in the lost city of Dwarika(4000-6000BC) contained 10.68% zinc. Similarly, scores of brass items of items of Buddha, coins and caskets had some 17-25% zinc.

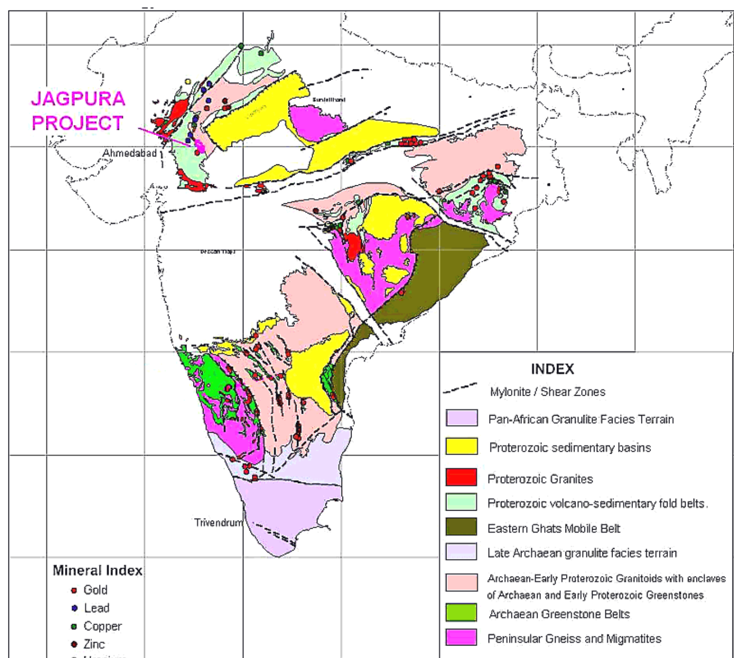
In fact an entire roll of sheet zinc at Agora in Athens in 300-400BC was found. And the Greeks were not producing zinc, and as we have ample evidence that it was produced in India, it can only be assumed they obtained these sheets from India. [unquote]

http://www.abovetopsecret.com/forum/thread111071/pg7



“Zinc alloys have been used for centuries, as brass goods dating to 1000-1400 BC have been found in Palestine and zinc objects with 87% zinc have been found in prehistoric Transylvania…the Hindus were aware of the existence of zinc as a metal separate from the seven known to the ancients.”
http://www.redorbit.com/modules/reflib/article_images/28_66bc72775f3eb8353bc01ba3c861703a.jpg
Brass was used in Lothal and Atranjikhera in the 3rd and 2nd millennium BCE.
“Among the old workings for zinc, the Zawar complex of Rajasthan in Western India is the most famous. Impressively abundant traces of old workings extend all over the 25 km mining belt and go down to a depth of 90 m below surface. It is claimed that the Zawar miners went up to depths exceeding 150m. The miners perhaps used wooden ladders, scaffolds and launders to drain water in the mines. The wooden samples of two such mines each at Zawar and at Mochina have been dated by ^{14}C. These dates certainly suggest that in the second half of first millennium BCE extensive mining and smelting of lead-zinc ores were done in western India and perhaps the metal was supplied for various regions for coins and other objects. The earliest dates we have for zinc distillation are from a white heap, which is of the 12th century AD.”
http://www.infinityfoundation.com/mandala/t_pr/t_pr_khara_zinc_frameset.htm
KTM Hegde and Ericson, J.E., 1985, Ancient Indian Copper Smelting Furnaces, in: *Furnaces and Smelting Technology in Antiquity*, ed. P.T. Craddock, Occasional Paper No. 48, British Museum, London, pp. 59-67: The survey covered six ancient copper ore mining and smelting sites in the Aravalli (Arbuda) hills extending over a thousand kms.: Khetri and Kho Dariba in NE, Kankaria and Piplawas in the Central part and Ambaji in SW.. A large majority of mine-pits measure 7-8 metres in dia. and 3-4

metres deep showing evidence of fire-treating of the host rocks on the mine walls to widen rock joints. The evidene indicated probable mining in the chalcolithic period. Timber supports recovered from a gallery at a depth of 120 metres at Rajpura-Dariba mines in Udaipur District were radio-carbon dated to 3120+_ 160 years before the present (1987). This correlates with the zinc-containing copper artefacts of Atran~jikhera.
"The Arthasastra describes the production of zinc. The Rasaratnakara by Nagarjuna describes the production of brass and zinc. There are references of medicinal uses of zinc in the Charaka Samhita (300 BC). The Rasa Ratna Samuccaya (800 AD) explains the existence of two types of ores for zinc metal, one of which is ideal for metal extraction while the other is used for medicinal purpose. It also describes two methods of zinc distillation." see: Craddock, P.T. *et al.*, Zinc production in medieval India, World Archaeology, vol.15, no.2, Industrial Archaeology, 1983.



http://en.wikipedia.org/wiki/History_of_metallurgy_in_the_Indian_subcontinent

"An ingenious method was devised of downward distillation of the zinc vapour formed after smelting zinc ore using specifically designed retorts with condensers and furnaces, so that the smelted zinc vapour could be drastically cooled down to get a melt that could solidify to zinc metal." http://www.tf.uni-kiel.de/matwis/amat/def_en/articles/metallurg_heritage_india/metallurgical_heritage_india.html
"Lead isotope analyses undertaken by the author on a zinc ingot with a 4th century Deccan Brahmi inscription (previously exhibited in Science Museum, London, courtesy Nigel Seeley) corroborated a likely Andhra Deccan provenance, making it one of the earliest known surviving examples of metallic zinc in the world." (Srinivasan, S. 1998. "Highlights of ancient south Indian metallurgy-technical evidence for the early use of high-tin bronzes, high-carbon steel, metallic zinc, smelting of bronze and cast images, *Proceedings of the Fourth International Conference on the Beginning of the Use of Metals and Alloy (BUMA-IV),* pp. 79-84. Matsue: Japan Institute of Metals).
http://www.indianscience.org/projects/t_pr_srinibook2.shtml
The Aravallies Belt in Rajasthan is host to a number of major base metal deposits, including the world class, open pit deposit of Rampur Agucha (62 Mt @ 13% Zn and

2% Pb resource). The Khetri deposit in Western Rajasthan contains 24 Mt @ 1.2% Cu and 1.5g/t Au. http://www.indogold.com.au/rajasthan_mineralresources.htm

Geological map of India showing gold, lead, copper, zinc, uranium mineral locations. http://www.indogold.com.au/fig_1.htm

The early meaning of svastika as a glyph

This note reviews the evidence of the use of svastika as a glyph throughout the ancient world for over 3 millennia. The conclusion is that it connotes an object, a mineral – zinc (maybe, in its zinc oxide form called calamine). Brass was an alloy of copper and zinc and was known even before zinc was sublimated and discovered; by melting copper with calamine, brass which was a relatively easy material to cast (at a melting point of about 900 degrees C) with a yellow color comparable to the color of gold was produced. This decipherment is consistent with the occurrence of svastika glyph in the following contexts:

together with an endless-knot glyph (mer.ed 'iron'; rebus: mer.hao 'twisted');
together with the glyphs of a tiger looking back and an elephant [(kol krammara 'alloy smith'; rebus: kol 'tiger', krammara 'turning back'); (ib 'iron'; rebus: ibha 'elephant')]
together with a drummer glyph
Syracuse coin showing Arethusa at the center of a svastika
together with ducks in a Cyprus artifact (shown in Annex 1)
spearhead from Germany (shown in Annex 1)

Depiction of four or five svastika glyphs is an indication of the number of parts of zinc mixed with, say, eight parts of copper to create different types of hard or soft brasses (high brass has 35% zinc; low brass has 20% zinc), including arsenical brasses or lead brasses. They are also combined with iron, silicon and manganese to increase wear and tear resistance. An alloy called Corinthian brass, an alloy of gold, silver and copper, was known in ancient times. (In later technological developments, zinc is used to galvanize steel to prevent corrosion). "Before the discovery of zinc metal in India (made by the distillation route) sometime during the fifth-fourth century BC, brass could be made, as in Lothal and Atranjikhera, only by the cementation route in which one of the following was smelted along with copper ore : zinc ore, sphalerite concentrate or the roasted product, philosopher's wool or zinc oxide. The traditions of making philosopher's wool and cementation brass could have persisted even after the discovery of the distillation process of making zinc… the distillation route of making zinc and alloying this with molten copper was the only way of making high-zinc (more than 28%) brass, such as the 4th century BC Taxila vase (34.34% zinc)" (Arun Kumar Biswas, Zinc and related alloys, http://metalrg.iisc.ernet.in/~wootz/heritage/zn.html

"References to Zinc and brass are found in the lost text Philippica or Theopompus (4th century BC), quoted in Strabo's Geography (XIII, 56): "There is a stone near Andreida (north west Anatolia) which yields Iron when burnt. After being treated in a

furnace with a certain earth it yields droplets of false silver. This added to copper, forms the so-called mixture, which some call oreichalkos." This pertains probably to the process of downward distillation of zinc ("droplets of false silver") and its subsequent mixing with Copper to make brass oreichalkos (arakuta in Kautilya's Arthasastra) described in detail in the post-Christian era Sanskrit texts." http://www.vanderkrogt.net/elements/elem/zn.html Caraka Samhita has references to medicinal uses of zinc(300 BCE).

A remarkable account of the use of svastika in ancient periods and conclusion that the glyph connoted an object is provided in: Thomas Wilson, 1896, *The Svastika_. The earliest known symbol, and its migrations; with observations on the migration of certain industries in prehistoric times,* Washington DC, The Smithsonian Institution, US National Museum, Washington DC.

Elsewhere, the entire corpus of Sarasvati hieroglyphs (Indus script epigraphs) has been deciphered as related to the repertoire of a smith and smithy. Consistent with this decipherment, the early meaning of svastika as a glyph is presented as a hieroglyph, read rebus: satva, 'zinc' (Pkt.) **satavu, satuvu, sattu** = pewter, zinc (Ka.) **dosta** = zinc (Santali) **jasta** = zinc (Hindi) **jasada, yasada, yasadyaka, yasatva** = zinc (Jaina Pali). Homonyms to denote the glyph are: **sathiya_** (H.), sa_thiyo (G.); satthia, sotthia (Pkt.) = svastika_ sign.

Many hieroglyphs (including svastika and endless-knot motifs) become metaphors of wealth as shown in the use on ashtamangala necklace and on archways hoisted with s'rivatsa glyph. (Details provided in notes on decipherment of Sarasvati hieroglyphs). Svasti which is derivable as su + asti in Sanskrit grammar is explained as a metaphor for 'welfare, auspiciousness' by the depiction of the glyph on temple doors, during the historical periods. The rationale for using the glyph to connote welfare is that zinc as an additive to create an alloy of copper called brass, produced a metal which was 'as good as gold', that precious metal called soma 'electrum'.

That zinc – represented by the hieroglyph, svastika -- was a traded commodity together with other minerals is apparent from the finds of epigraphs containing Sarasvati hieroglyphs at locations such as Altyn Depe. Swat, Seistan.

The burden of this monograph is that this 'object' was in fact, zinc, a commodity traded and used for alloying with copper, to create brass. This alloy has alchemical overtones as discussed in Kalyanaraman, 2006, *Indian Alchemy: Soma in the Veda*, Delhi, Munshiram Manoharlal.

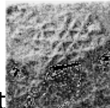
Svastika, the earliest known symbol

An interesting point is that some scholars agree that the model for the symbol of svastika_ must have been an object, known and useful throughout the ancient world. [Thomas Wilson, 1896, *The Svastika_. The earliest known symbol, and its migrations; with observations on the migration of certain industries in prehistoric times,* Washington DC, The Smithsonian Institution, US National Museum,

Washington DC]. See notes at Annex 1 (Svastika and Endless-knot motifs) The annex also shows the picture of a special furnace for making bangles. The lid is stamped with a glyph, apparently before firing.

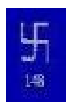
Our hypothesis is that the traders with their seals, and people who travelled in Swat and Seistan, in search of minerals, were the bronze-age smiths and lapidaries of Meluhha.

Association of svastika with endless-knot motif on epigraphs

m1356 m443Atm443Bt The svastika glyph is associated with endless-knot glyph; the endless-knot glyph appears on a copper plate epigraph, indicating that both glyphs may connote the products made by metal-workers or equipment/processes involved in metal-work. **mer.hao** = v.a.m. entwine itself; wind round, wrap round roll up; mar.hna_ cover, encase (H) (Santali.lex.Bodding) Rebus: **me~e.he~t** = iron (Santali)

The seals m443 and m1356 show the endless knot motif together with the svastika_ glyph. The semantics connoted: **me.rha**, 'twisted; leader, merchant's clerk, **med.h**'; svastika_, 'caravan'; the Sumer cylinder seal impression showing a chariot-rider and a caravan, by adding the endless knot motif as a semantic determinant is a depiction of a merchants' caravan, **med.h svastika_.**

This interpretation is suggested because the des'i_ phonemes for svastika_ are: suvatthi, sotthi = well-being (Pali)(CDIAL 13913). sa_thiyo = auspicious mark painted on the front of a house (G.)(CDIAL 13917). svastika_ is the emblem of the seventh deified teacher of the present era (Jainism)(G.lex.)



The symbol or the word, 'svasti' becomes an invocatory message on many epigraphs of the historical periods in Bha_rata.

Terracotta stamp seal, Taxila, c. 1st cent. CE. [After Parpola, 1994, fig. 4.6]



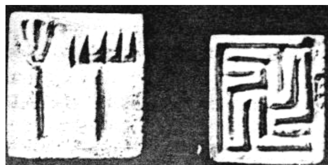

Mcmohan  cylinder seal with six signs, found in 'Swat and Seistan', unrolled photographically and the unbroken stamp-end of the seal; positive impression of the cylinder showing Harappan inscriptions (Robert Knox, 1994, A new Indus Valley Cylinder Seal, pp. 375-378 in: *South Asian Archaeology* 1993, Vol. I, Helsinki) The triangle motif is similar to the motif shown on M-443B.

"The Seistan findspot of this seal is of great interest. Evidence exists for the movement of Indus commodities, and, therefore, Indus commercial activities in the

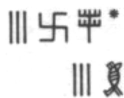
direction of western Asia and, in return, from there to the Indus world.Evidence for the Harappan penetration of Seistan and farther to southeastern Iran is scanty but includes at least one other Indus inscription from an impression of a sherd discovered at Tepe Yahya, period IV A (c. 2200 BC) (Lamberg- Karlovsky and Tosi 1973: pl. 137)" (Knox, p. 377).

Paul Amiet suggests an Iranian origin for the svastika motif. [Paul Amiet, 1961, *La glyptique Mesopotamienne Archaique,* Paris]

Two seals found at Altyn-depe (Excavation 9 and 7) found in the shrine and in the 'elite quarter'. V.M. Masson, Seals of a Proto-Indian Type from Altyn-depe, pp. 149-162; V.M. Masson, Urban Centers of Early Class Society, pp. 135-148; I.N. Khlopin, The Early bronze age cemetery in Parkhai II: The first two seasons of excavations, 1977-78, pp. 3-34 in: Philip L. Kohl (ed.), 1981, *The Bronze Age Civilization in Central Asia*, Armonk, NY, ME Sharpe, Inc. "The discovery in Altyn-Depe of a proto-Indian seal with two signs deserves special mention. V.M. Masson pointed out, that what the seal depicted was a pictogram and not just a representation of animals. In his opinion this means that some of the ancient residents of Altyn-Depe were able to read this text."(G. Bongard-Levin, 1989, Archaeological Finds in Central Asia throw light on Ancient India, Jagdish Vibhakar and Usha Gard (Eds.), *Glimpses of Ancient India through Soviet Eyes*, Delhi, Sundeep Prakashan).



Text 4500 (Incised miniature tablet; not illustrated).



Thus, a svastika appears together with an elephant or a tiger.The 'svastika' is a pictorial and also a sign

Svastika_: A marker of Bronze-age civilization in Bha_rata; its significance in the context of bronze-working in Bha_rata with parallel imageries of Cyprus

mer.ha = twisted, crumpled, as a horn (Santali.lex.) **meli, melika** = a turn, a twist, a loop, entanglement; **meliyu**, melivad.u, meligonu = to get twisted or entwined (Te.lex.) [Note the endless knot motif].

The seals m443 and m1356 show the endless knot motif together with the svastika_ glyph. The Sumer cylinder seal impression showing a chariot-rider and a caravan, by adding the endless knot motif (figure shown in a later section) as a semantic determinant is a depiction of iron and zinc: **med.h, satthiya .**



Sign 148 Glyph:

There are over 50 inscribed objects with just the svastika_ pictorial motif.

In the Punjab, the mixed alloys were generally called, **bharat** (5 copper, 4 zinc and 1 tin). In Bengal, an alloy called **bharan** or **toul** was created by adding some brass or zinc into pure bronze. Sometimes lead was added to make it soft.

Arethusa and svastika_

Svastika_ is a dominant glyph among the epigraphs of Sarasvati Civilization. Over 50 inscribed objects depict this glyph.

That the head of Arethusa is imprinted on a tin ingot and on a Greek coin in the middle of a svastika_ glyph is a pointer to the decoding of the true meaning of svastika_ glyph. The morpheme which occurs in Kannada may hold a key to this decoding: **satavu, satuvu, sattu** = pewter, zinc (Ka.) **dosta** = zinc (Santali) **jasta** = zinc (Hindi) **jasada, yasada, yasadyaka, yasatva** = zinc (Jaina Pali) **ruhi-tutiya** (Urdu) **tuttha** (Arthas'a_stra) **totamu, tutenag** (Te.) **oriechalkos** (Gk.)

Homonyms are: **sathiya_** (H.), sa_thiyo (G.); satthia, sotthia (Pkt.) = svastika_ signcf. svastika 'meeting of four roads' (Sk.) svastika the meeting of four roads; the crossing of the arms, making a sign like the cross (Skt.lex.) canti the cross roads, junction of three or more roads (Tirumuru. 225); cantikkarai junction where several roads meet (Ta.lex.)

A copper additive, **'tin or arsenic or zinc'** creates the alloy bronze/brass.

In early cementation processes roasted zinc ore (oxide) was mixed with copper fragments and charcoal (reducing agent) and the mixture was heated in a sealed crucible upto 1000 degrees C. The zinc vapour dissolved to yield a quality of brass. Examples of brass have been found in Lothal and Atranjikhera (6.28 to 16.2 % zinc) dated to c. 3rd and 2nd millennia BCE respectively. Carbon 14 dates (uncalibrated) for the Zawar mines of Rajasthan (40 kms. south of Udaipur) are PRL 932, 430+100 BCE and BM 2381, 380+ 50 BCE. Mining of lead zinc ores are found in the old workings at Rajpura-Dariba (375 BCE) and Rampura-Agucha (370 BCE) . At Prakashe, a Chalcolithic site (2nd millennium BCE) in Deccan, two copper objects each containing 25.86 and 17.75 percent zinc have been found. A vase found at Bhir mound (3rd cen. BCE), Taxila contained 34.34% zinc. A part of chariot in submerged Dwarka assayed 10.68% zinc (unknown date); many copper coins and many bronze images of historical periods contain upto 25% zinc. Silver used in many punch-marked coins was obtained from Zawar mines which yielded copper, zinc, lead and silver.

On coins from Syracuse the head of Arethusa was often portrayed (ca. 500 BCE). This girls' head has often a net in her hair and is usually surrounded by fish.



Arethusa coin from Syracuse, 4th cent. BCE



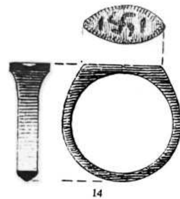
Arethusa is a water

divinity, as shown by the four fish circling around; she wears a diadem of beads.

Arethusa on a Greek coin [c. 510-490 BCE] The coin shows the image of Arethusa in the middle of a **svastika_** glyph. Arethusa, a nymph known in several different parts of Greece, usually the Pelopponnese and Sicily. She was one of the Nereids. The river-god Alpheus fell madly in love with her, but she fled to Sicily. There she was changed into a fountain (the Fonte Aretusa, in Syracuse) by Artemis. Apheus made his way beneath the sea, and united his waters with those of Arethusa.

Svastika, a traded commodity -- zinc

The svastika glyph connotes a countable object as seen from the number of glyphs shown on inscribed objects, On h165 seal, there are 4 svastika signs; this leads to the surmise that the svastika represents a countable *object.*

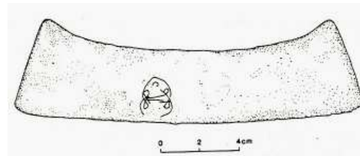




Copper finger ring, Sirkap, Taxila, Stratum I, (Pl. 197, No. 24, Marshall); a total of nine symbols are inlaid on the ring including svastika_, vajra, cakra, triratna, s'ri_vatsa, Pl. XXII.

Vajra and cakra are weapons. It is likely that svastika_ is also a weapon or tool: s'akti (flag)staff, spear (MBh.); **satti** = knife, dagger (Pali); satti = a kind of weapon (Pkt.); sa_t = sword, spear (CDIAL 12251). It can be demonstrated that the 's'ri_vatsa' glyph is a derivative from a composite glyph of two fishes.
Svastika_ connotes **satva, sattu** 'zinc, pewter'; endless-knot connotes **mer.ed** 'iron'. (Rebus: sattiya 'svastika glyph'; mer.hao 'twisted')
Endless-knot motif appears on the following objects:

1. Rojdi. Ax-head or knife of copper, 17.4 cm. long (After Possehl and Raval 1989: 162, fig. 77



2. Cylinder seal impression. Sumer (ca. 2500 BCE). After Amiet 1980a: pl. 108, no. 1435





3. Early Dynastic seal. Lagash.
Early Dynastic seal, depicting an endless knot motif facing the turned face (**krem-**) of a battling tiger (**kol-kamar**, smelter-smith); Lagash. [After Amiet, 1980, pl. 83: no. 1099]

The endless-knot glyph and the signs may be read as:

Alternatives:

Alternative: Substantive: *me~rhe~t* 'iron'; *me~rhe~t icena* 'the iron is rusty'; *ispat me~rhe~t* 'steel', *dul me~rhe~t* 'cast iron'; *me~rhe~t khan.d.a* 'iron implements' (Santali) *med.* (Ho.)(Santali.lex.Bodding) mer.ed, mr.ed, mrd iron; enga mer.ed soft iron; sand.i mer.ed hard iron; ispa_t mer.ed steel; dul mer.ed cast iron; i mer.ed rusty iron, also the iron of which weights are cast; bicamer.ed iron extracted from stone ore; balimer.ed iron extracted from sand ore (Mu.lex.)

The entwined stones around a pillar or an entwined snake glyph:

mer.hao = v.a.m. entwine itself; wind round, wrap round roll up; mar.hna_ cover, encase (H) (Santali.lex.Bodding) [Note: the endless-knot motif may be a rebus representation of this semant. 'entwine itself']. **med.ha_** = curl, snarl, twist or tangle in cord or thread (M.); **meli, melika** = a turn, a twist, a loop, entanglement; **meliyu**, melivad.u, meligonu = to get twisted or entwined (Te.lex.) **merhao** = twist (Mun.d.ari)

med.i = sound, roar (TS 5.7.8.1); methis.t.ha = worthy of hearing (TBr. 2.7.6)(Vedic.lex.) **mleccha** = a man speaking any language but Sam.skr.ta and not conforming to brahmanical institutions; a kira_ta, s'abara or pulinda etc.; mleccharene kod.ava kod.agaru…kod.ava kon:garu (Ka.lex.) mlaskati = to snap with tongue (Slovan)(Vedic.lex.) mle_ch = speak indistinctly (Skt.); mle_cchati speaks indistinctly (S'Br.) brichun, pp. bryuchu = to weep and lament, cry as a child for something wanted or as motherless child (K.)(CDIAL 10384). milakkha, milakkhu non-aryan (Pali); malak savage; malaki-du_ a Vadda_ woman (Si.); mila_ca wild man of the woods, non-aryan (Pali); maladu wild, savage (Si.); mi_cuth, mi_catas habit or life of an outcaste (K.)(CDIAL 10390). mle_ccha = non-aryan (S'Br.); maleccha, miliccha, meccha, miccha = barbarian (Pkt.); mi~_ch, mi~_cas non-hindu (K.); milech, malech Moslem, unclean outcaste, wretch (P.); mele_ch dirty (WPah.); mech a Tibeto-Burman tribe (B.); milidu, milindu wild, savage (Si.)(CDIAL 10389).

Alternative : d.on.t.ho 'knot'; rebus: d.hon.d. 'stone-cutter'

Glyph: *d.on.t.ho, dhon.t.ho, dhon.t.o* a knot (Santali)

d.hon.d.-phod.o [M. dhon.d.a_, a stone] a stone-cutter, a stone-mason; *d.hon:d.-jhod..o* [M. *dhon.d.a_* a stone + *jhod.avum*] a stone-cutter; a stone-mason; *d.hon.d.o* a stone; a blockhead; a stupid person (G.)

kacc iron, iron blade (Go.)(DEDR 1096). kars.i furrowing (Skt.); ka_rs.i ploughing (VS.); kars.u_ furrow, trench (S'Br.); ks.i_ plough iron (Pr.); kas.i mattock, hoe (Pas'.); kas.i spade, pickaxe (Shum.); khas.i_ small hoe (Dm.)(CDIAL 2909). kr.s.ika, kus'ika, kus'i, kus'ira a ploughshare (Skt.Ka.)(Ka.lex.) kes.a plough (Pas'.)(CDIAL 3444). kis' plough (Kho.)(CDIAL 3455). ks.e plough iron (Pr.)(CDIAL 2809). <u>Mattock, hoe</u>: kas.i mattock, hoe (Pas'.); <u>Spade, pickaxe</u>: kas.i spade, pickaxe (Shum.); kars.i furrowing (Skt.); kars.u~ furrow, trench (S'Br.)(CDIAL 2909)

keccu the knot which is formed by twisting; to join the end of two threads by twisting them with the fingers (Ka.); kerci a knot (Tu.)(DEDR 1965).

granthi = knot (RV. 9.97.18); ga_n.t.ha (H.); granthin = twined together (RV 10.95.6); granth = to tie together (Vedic lex.)

L051a Seal. **granthi** = honey-comb (Pa_n. 4.3.116, Va_rtt.); cf. Nir. 1.20; granthi = knot of a cord, knot tied in the end of a garment for keeping money (Pan~cat.); a knot tied closely and therefore difficult to be undone, difficulty, doubt (Ch.Up.); granthila = knotted, knotty; grath = to be crooked (Dha_tup. 2.35); granthi = crookedness (Skt.lex.)

gan.t.lu (pl.), gan.t.i = hole bored in ears for ear-rings (Te.lex.)

brahma granthi = a sort of knot holding together the ends of dwija's sacred thread; gan.t.u = a knot (Te.lex.) grathana_ = tying, binding, ensnaring; grathita = strung, tied (RV 9.97.18; S'Br. 11) (Skt.lex.)

kranta = the meeting place of cross-roads; a lane; a hole (Te.lex.)

A remarkable demonstration of

(1) the continuity of the motif of endless knot in the Indian civilization from ca. 3rd millennium BC upto the 17th cent. AD.and even today, in South India; and
(2) the parallel use of the motif of the endless knot in Mesopotamian civilization ca. 3rd millennium BC.

grantha = a book or composition in prose or verse; a code; grantha lipi = one of the various characters used in writ (Ka.lex.)

kr.ta = injured, killed; kr.ti = hurt, hurting, injuring; a kind of weapon, sort of knife or dagger (RV 1.163.3) (Skt.lex.)

krandukayyamu = tumultuous mob fight (Te.lex.)

krandadi.s.t.i = having roaring speed or moving with a great noise, said of Va_yu (RV 10.100.2); kranda = a cry, neighing (AV 11.2.22); a cry, calling out (AV 11.2.2 and 4.2) krandanu = roaring (RV 7.42.1); krandya = neighing (TBr. 2.7.7.1, parjanya krandya); krandana = crier; crying out; mutual daring or defiance, challenging (Skt.lex.). khar. = a call to cattle (Santali.lex.) khat. khat. = with a swish, thud, as of a horse's hoofs (Santali.lex.) kharajru = quick in motion (RV 10.106.7)(Vedic.lex.) kranditamu, krandanamu = cry, lamentation; krandillu = to sound, to resound (Te.lex.)

kratha = name of a race always named with the Kais'ikas and belonging to the ya_dava people; name of an Asura (MB h. 2.585; Skt.lex.)

kranta = the betrothal presents taken to the bride from the bridegroom's house (Te.lex.) **grantha** = giving, da_na; bha_gi, vibha_ga (Ka.lex.)

grantha = wealth, property (Ka.lex.)

Inscribed objects containing the 'endless knot'

Glyph: The endless knot = **kra_nta, ga_n.t.ha** (Hindi) [cf, Lagash. Early Dynastic Seal with a variant of the endless knot. After Amiet 1980a: pl. 83, no. 1099.]

Substantive: **kra_nta** = invading, attacking (Skt.lex.) In the Tantra tradition, Bha_ratavars.a is divided into three parts called kra_nta-s: vis.n.u-kra_nta, ratha-kra_nta, as'va-kra_nta each part having 64 tantra-s attached.

Land east of the Vindhya ranges, extending upto Ja_va is Vis.n.u-kra_nta; the region north of Vindhya including maha_ci_na is as'va-kra_nta and the rest of the nation is as'va-kra_nta.

krandas = battle-cry, army (RV 10.121.6) yam krandasi_ avasa_ tastab ha_ne 'dya_va_pr.thivyau' (Vedic.lex.) krath = to hurt, kill (Dha_tup. 19,39; caus. kra_thayati, to hurt, injure, destroy (with gen. of the person hurt, Pa_n. ii, 3.56, Dha_tup. 34.19); krathana = cutting through (as with an ax); slaughter, killing (Skt.lex.) krathana = killing, slaughter (Ka.lex.) gan.t.u = to cut, to wound; a wound, hurt; gan.t.i = a wound (Te.lex.)

krandas = n. battle-cry; du. two contending armies shouting defiance [heaven and earth: Sa_yan.a]

yam krandasi_ sr.latayati_ vihvyete pare vara ubhaya_ amitra_h
sama_nam cid ratham a_tasthivalatasa_ na_na_ havete sa jana_sa indrah
RV 2.012.08 Whom (two hosts), calling and mutually encountering, call upon; whom both adversaries, high and low, (appeal to); whom two (charioteers), standing in the same car, severally invoke; he, men, is Indra. [Whom (two hosts): yam krandasi_ sanyati_ vihvayete = whom, crying aloud, encountering (two), invoke; the substantive is supplied: rodasi_, heaven and earth; or, dve sene, two armies; whom (two charioteers): here also a substantive is supplied: rathinau, two charioteers; or Agni and Indra].

s'u_ro va_ s'u_ram vanate s'ari_res tanu_ruca_ tarus.i yat kr.n.vaite
toke va_ gos.u tanaye yad apsu vi krandasi_ urvara_su bravaite

RV 6.025.04 The hero, (favoured by you), assuredly slays the (hostile) hero by his bodily prowess, when, both excelling in personal strength, they strive together in conflict, or when, clamorous, they dispute for (the sake of) sons, of grandson, of cattle, of water, of land.

yam krandasi_ avasa_ tastabha_ne abhy aiks.eta_m manasa_ rejama_ne

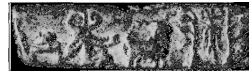
yatra_dhi su_ra udito vibha_ti kasmai deva_ya havis.a_ vidhema

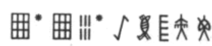
RV 10.121.06 Whom heaven and earth established by his protection, and shining brightly, regarded with their mind, in whom the risen sun shines forth -- let us offer worship with an oblation to the divine Ka.

The importance of the glyph denoting **svastika** may be seen from the composition in m0488 tablet in bas relief. It occupies the center of the field and is flanked by an elephant and a tiger looking back:

m0488Atm0488Btm0488Ct




2802 Prism: Tablet in bas-relief. Side b: Text +One-


horned bull + standard. Side a: From R.: a composite animal; a person seated on a tree with a tiger below looking up at the person; a svastika within a square border; an elephant (Composite animal has the body of a ram, horns of a zebu, trunk of an elephant, hindlegs of a tiger and an upraised serpent-like tail). Side c: From R.: a horned person standing between two branches of a pipal tree; a ram; a horned person kneeling in adoration; a low pedestal with some offerings.
On side B of a tablet (h177), kneeling person is shown in prayer in front of a standing person under an arch decorated with a toran.a of ficus leaves.

man.d.a = a branch; a twig (Te.lex.)

man.d.i = kneeling position (Te.lex.) mandil, mandir = temple (Santali) ma_d.a = shrine of a demon (Tu.); ma_d.ia = house (Pkt.); ma_l.a a sort of pavilion (Pali); ma_l.ikai = temple (Ta.)(DEDR 4796).

man.d.iga = an earthen dish (Te.lex.) **man.d.e** = a large earthen vessel (Tu.lex.) **man.di** earthen pan, a covering dish (Kond.a); cooking pot (Pe.); brass bowl (Kui); basin, plate (Kuwi)(DEDR 4678). man.d.e = head (Kod.)(DEDR 4682).

man.d.a_ = warehouse, workshop (Kon.lex.)

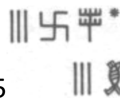
Glyph: *sal* a gregarious forest tree, *shorea robusta*; *kambra* a kind of tree (Santali)
Substantive: *sal* workshop (Santali)


m0482At

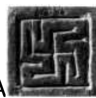
m0482Bt

1620

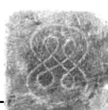
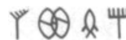
Pict-65: Gharial (or lizard), sometimes with a fish held in its jaw and/or surrounded by a school of fish.

 h165 4500 On h182 tablet, there are 5 svastika signs; on h165 seal, there are 4 svastika signs; this leads to the surmise that the svastika represents a countable *object.* Ponea 'four' (Santali); rebus: pon 'gold' (Ta.); sathiya 'svastika glyph'; rebus: sattva, jasada 'zinc' (Ka.Skt.H.) mo~r.e 'five (count)' (Santali); rebus: man.d.ua 'booth, shed' (Santali)

On tablet m0482, the svastika follows the glyph of a tree branch '*aduru*'; hence the two signs may be read as: *aduru* 'metal' + *satthiya* 'knife, dagger' (*s'akti* –Skt.) swadhiti (RV.AV.) **sathiya_** (H.) knife, dagger; sathia_, satthaka = knife (Pkt.Ka.)

 m1225A  m1225B.  1311 Cube seal with perforation through the breadth of the seal Pict-118: svastika_ , generally within a square or rectangular border.

.  m1389t  Rahman-dheri150

 m0507At  m0507Bt  3350
 m0508At  m0508Bt  3352

http://kalyan97.googlepages.com/svastika1.doc
http://kalyan97.googlepages.com/svastika2.doc
http://kalyan97.googlepages.com/annex1asvastika.doc
http://kalyan97.googlepages.com/annex1bsvastika.doc
http://kalyan97.googlepages.com/Annex2aSvastikaseals.doc
http://kalyan97.googlepages.com/Annex2bSvastikaseals.doc

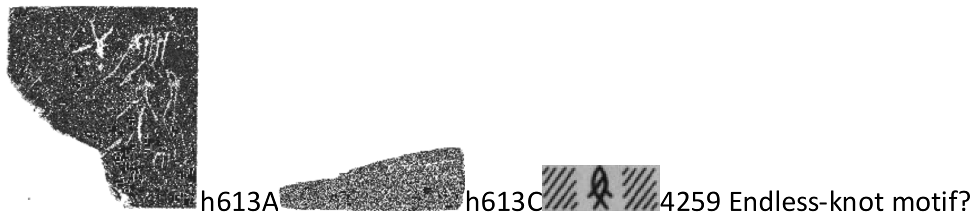
Rao finds the svastika motif more common in Mesopotamia than in the Sarasvati civilization. Paul Amiet suggests an Iranian origin for the svastika motif. [Paul Amiet, 1961, *La glyptique Mesopotamienne Archaique,* Paris]




Yaudheya coin. Godess Sas.t.hi on reverse. S.an.mukha with lance on obverse. Lucknow State Museum. A remarkable legacy of the Sarasvati Sindhu inscriptions is echoed in the glyphs of a

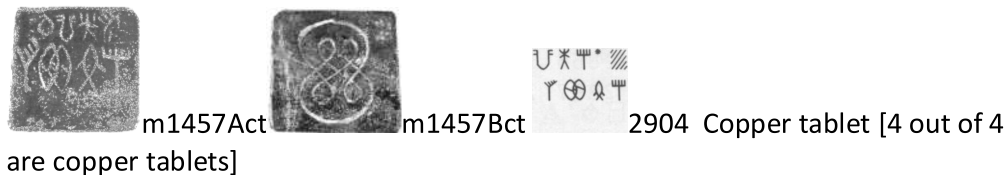
svastika_ above tree on railing (*Journal of the Numismatics Society of India*, Vol. V, Pt.I, June 1943) This is obviously a rebus pun on the word: satthi, s'akti, spear, sas.t.i = six, satthika = auspicious symbol. The tree may be also be a rebus representation.

Godess S'as.t.hi. Mathura, 2nd cent. Mottled red sandstone 67.8 X 34.5 cm (MIK I 5924). "The godess lifts her right hand in a gesture of salutation that is typical of the Kushana period. The hand is slightly turned inwards, towards the body (vya_vr.tta-mudra). Her left arm, which bends outward, rests on her hip. She wears a broad girdle, a thin band around the waist, and aa sash over the shoulders and arms. her jewellery comprises earrings, a braod necklace, and bangles... on the large nimbus, which occupies the entire upper half of the stele, five more female figures are seen, which seem to emanate from the main figure. Each of the secondary figures have both arms lifted, perhaps in an expression of joy. They hold certain objects in their hands which are difficult to identify... the large size of the present stele suggests that it was meant for a temple..." (Heino Kottkamp, Exhibit 26 in: Saryu Doshi, ed., 1998, *Treasures of Indian Art: Germany's tribute to India's cultural heritage*, Delhi, National Museum, p.33).


h613A h613C 4259 Endless-knot motif?


Chanhudaro49A Chanhudaro49B

Chanhudaro50A Chanhudaro50B

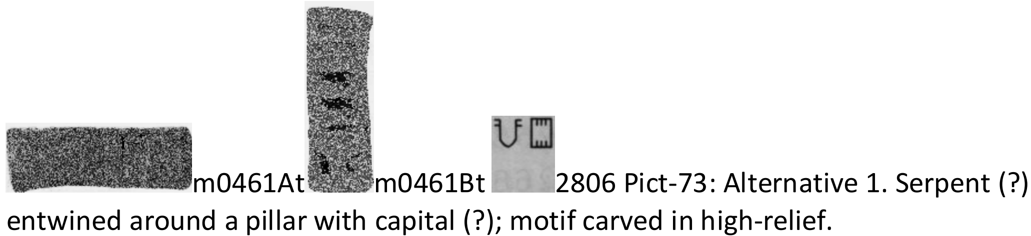

m1457Act m1457Bct 2904 Copper tablet [4 out of 4 are copper tablets]


m0457At m0457Bt m0457Et [Frequency 13]

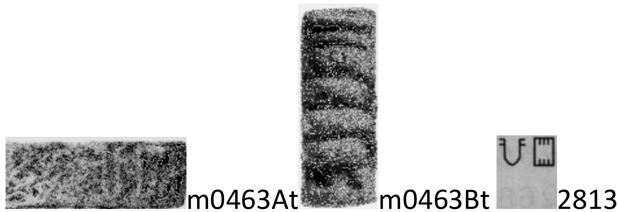

m0458At m0458Bt 3227


m0459At m0459Bt 3225


m0460At m0460Bt 3228


m0461At m0461Bt 2806 Pict-73: Alternative 1. Serpent (?) entwined around a pillar with capital (?); motif carved in high-relief.


m0462At m0462Bt 3215


m0463At m0463Bt 2813


Four-crosses motif on a Mohenjo-daro tablet M-463 is comparable to the same motif which appears painted on a potsherd of Malwa ware from Navdatoli, Maharashtra, c. 1700-1400 BCE. [After H.D.Sankalia, SB Deo and ZD Ansari, 1971, *Chalcolithic Navdatoli: the excavations at Navdatoli, 1957-59*. Poona: 216f., fig. 87: D 585 (sherd 8355 I A 13/5; After Paropla, 1994, p.55, fig. 4.4).

Alternatives:
ko_lam = form (Ta.Ma.) Rebus: **kol** 'metal'

kan.d.a kanka 'rim of pot'; rebus: **kan.d.** 'altar, furnace' + **kan-** 'copper'

pa~er.e~ = overflow channel of a tank (Santali).

Rebus: articles of joint family (**pa~er.e~**) (Santali).

Alternatively, the endless-knot motif which follows the pair of signs (following Text 2813, for example) may be read as:

me~e.he~t = iron (Santali)

The entwined stones around a pillar or an entwined snake glyph:

mer.hao = v.a.m. entwine itself; wind round, wrap round roll up; mar.hna_ cover, encase (H) (Santali.lex.Bodding) [Note: the endless-knot motif may be a rebus representation of this semant. 'entwine itself']. **med.ha_** = curl, snarl, twist or tangle in cord or thread (M.); **meli, melika** = a turn, a twist, a loop, entanglement; **meliyu**, melivad.u, meligonu = to get twisted or entwined (Te.lex.) **merhao** = twist (Mun.d.ari)

Rebus: **melukka** 'copper'
Alternative 1: (sharp weapon; sharpness connoted by the 'knot' glyph): Substantive: **patam** = sharpness (as of the edge of a knife)(Ta.); padm (obl. Padt-) temper of iron (Ko.); pada = keenness of edge or sharpness (Ka.); **hada** = sharpeness (as of a knife), forming (as metals) to proper degree of hardness (Tu.); **padna_** sharpness (Go.); padanu, padunu = sharpness, temper (Te.); **padnu** = sharpening (of knife by heating and hammering)(Kond.a); pato = sharp (as a blade); **patter** = to sharpen (Malt.)(DEDR 3907).
badha = bound; **bandha** = tied up, hindered; bandh = an iron band round the nave of a cart wheel to prevent it from splitting (Santali)
paddu = item, entry in an account (Te.); **poddu** – thing, item (Pa.)(DEDR 3919).
pantam = torch, lamp (Ta.); torch (Ma.); pantye small lamp (Tu.)(DEDR 3919). [Note the procession carrying the standard device, the one-horned bull and perhaps a torch in front.]
badhor, badhor.ia = crooked, cross grained, knotty (Santali.lex.)
badhoria 'expert in working in wood'(Santali)

Alternative 2: melh 'copper'; rebus: mer.hao 'entwined'; **mer.hao** = to entwine itself, wind round, wrap around, roll up (Santali.lex.) [Note the endless knot motif].

Glyph: *malukku* slip-knot (Ta.); *malaku* a turn, twist, fold (Ka.); *mala-gonu* to be twisted; *maluku* a turn, slip-knot (Te.)(DEDR 4734).

Melukka = copper (Pali)

Alternative 3: d.on.t.ho 'knot'; rebus: d.hon.d. 'stone-cutter'

Glyph: *d.on.t.ho, dhon.t.ho, dhon.t.o* a knot (Santali)

d.hon.d.-phod.o [M. dhon.d.a_, a stone] a stone-cutter, a stone-mason; *d.hon:d.-jhod..o* [M. *dhon.d.a_* a stone + *jhod.avum*] a stone-cutter; a stone-mason; *d.hon.d.o* a stone; a blockhead; a stupid person (G.)

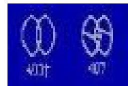
Considering that on the cylinder seal impression from Sumer the motif of 'endless-knot' is shown together with a chariot accompanied by persons carrying weapons and also a dog, the entire glyptic could be related to a hunting expedition. This is consistent with the other part of the cylinder seal on the top register depicting a boat journey, also accompanied by a person carrying a spear. Thus, the 'endless-knot' as a glyph should be related to semant. 'attack' or 'killing'.

The association of the 'endless-knot' glyph with the 'svastika' glyph points to both the glyphs as related to the description of a weapon.

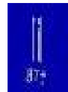


h182A h182B 430
6Tablet in bas-relief
h182a Pict-107: Drummer and a tiger. h182b Five svastika signs alternating right- and left-handed. har609 terracotta tablet, bas-relief [The drummer is also shown on h182B tablet with a comparable epigraph and five svastika glyphs alternating right- and left-handed arms. [Lexeme : **mo~r.e~** = five (Santali. lex.)]

The text 4306:



Glyph: cur.i a bracelet, a bangle (Santali)
Glyph: millstone: san:ghat.i = a millstone, that crushes (Ka.)
Rebus: cu_l.ai, 'kiln' (Ta.) culli = a fireplace (Ka.)
Rebus: saghad.i_ = furnace (G.)

 (34)  (21)

Glyph: *d.hol* 'a drum beaten on one end by a stick and on the other by the hand' (Santali); *d.hol* 'drum' (Nahali); *dhol* (Kurku); *d.hol* (Hi.) *dhol* a drum (G.) Rebus: **dul** 'to cast in a mould'; **dul me~r.he~t, dul mer.ed., dul**; **kot.e mer.ed.** 'forged iron' (Santali)

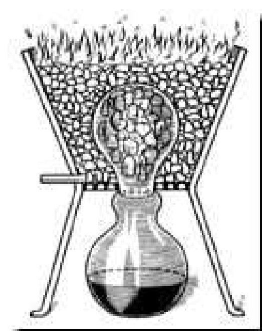
Vikalpa: *man.d.ao* 'to occupy a new house, to take up one's residence'; *man.d.hwa, man.d.ua, man.d.wa* 'a temporary shed or booth erected on the occasion of a marriage'; *man.d.om* 'a raised platform or scaffold'; *ma~r.om* 'a platform, used to keep straw on, or from which to watch crops' (Santali) *mandar* 'the headman of a village'; *man.d.wari* 'the Marwari caste of hindus' *Ko.* man Toda mund (i.e. village); burning place for dry funeral; mandm (*obl.* mandt-) meeting. *To.* mo (*obl.* mot-)

locus of tribal activity, including village with dairy, dairy apart from village, and funeral place; patrilineal clan. *Ka.* mandu hamlet of the Todas on the Nilagiri. *Ko�.* mandï village green; *Ta.* ma��u hall of assembly, golden hall of Chidambaram, court of justice, arbitration court, cow-stall, herd of cows, raised platform under a tree for village meetings, centre of a garden, junction of four roads or streets (DEDR 4777).

Glyph: mo~r.e 'five' (Munda etyma)

Sattva 'svastika glyph'; rebus: jasta, yasada, sattva 'zinc'
Mo~r.e 'five (count)'; rebus: man.d.ua 'booth, shed'

The hieroglyph showing five svastika: zinc-shed or zinc-granary.



Discovering the 8th metal A history of Zinc
Fathi Habashi

History of Zinc

Centuries before zinc was discovered in the metallic form, its ores were used for making brass and zinc compounds were used for healing wounds and sore eyes. Although the word brass frequently occurs in the Old Testament, there is little evidence that an alloy of zinc and copper was known in early times. The word translated "brass" might equally well be rendered bronze or copper, both of which were in common use.

Figure1: Schematic representation of the Indian method for producing zinc.

In the latter part of the thirteenth century, Marco Polo described the manufacture of zinc oxide in Persia and how the Persians prepared tutia (a solution of zinc vitriol) for healing sore eyes.

The Roman writer Strabo (66 B.C. - 24 A.D.) mentioned in his writings that only the Cyprian ore contained "the cadmian stones, copper vitriol, and tutty," that is to say, the constituents from which brass can be made. It is believed that the Romans first made brass in the time of Augustus (20 B.C. to 14 A.D.) by heating a mixture of powdered calamine, charcoal and granules of copper. Roman writers observed that coins made from orichalcum were undistinguished from gold.

Zinc in India

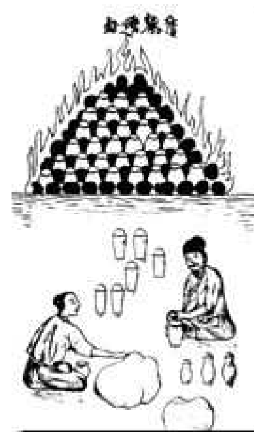
The production of metallic zinc was described in the Hindu book Rasarnava which was written around 1200 A.D. The fourteenth century Hindu work Rasaratnassamuchchaya describes how the new "tin-like" metal was made by indirectly heating calamine with organic matter in a covered crucible fitted with a condenser. Zinc vapour was evolved and the vapour was air cooled in the condenser located below the refractory crucible (Figure 1). By 1374, the Hindus had recognized that zinc was a new metal, the eighth known to man at that time, and a limited amount of commercial zinc production was underway.

At Zawar, in Rajasthan, great heaps of small retorts bear testimony to extensive zinc production from the twelfth to the sixteenth centuries. The tubular retorts are about 25 cm long and 15 cm in diameter with walls about 1 cm thick. A small diameter tube was sealed onto the open end and the zinc vapours likely condensed in this. The

retorts were closely spaced in a furnace which was probably heated with charcoal fanned by bellows. Both zinc metal and zinc oxide were produced. Zinc was used to make brass whereas the oxide was used medicinally. Over 130,000 tons of residue remain at Zawar and this represents the extraction of the equivalent of 1,000,000 tons of metallic zinc and zinc oxide.







Zinc in China

Figure 2: The Chinese learned about zinc production sometime around 1600 A.D.

From India, zinc manufacture moved to China where it developed as an industry to supply the needs of brass manufacture. The Chinese apparently learned about zinc production sometime around 1600 A.D. An encyclopedia issued in the latter half of the sixteenth century makes no mention of zinc, but the book Tien-kong-kai-ou published early in the 17th century related a procedure for zinc manufacture. Calamine ore, mixed with powdered charcoal, was placed in clay jars and heated to evolve zinc vapour. The crucibles are piled up in a pyramid with lump coal between them (Figure 2), and, after being brought to redness, are cooled and broken. The metal is found in the center in the form of a round regulus. Zinc production expanded and metal began to be exported.

Zinc in Europe

Figure 3: Albertus Magnus described the production of brass.

Albertus Magnus (Figure 3) (ca. 1248) described how either calamine or furnace tutty might be used to colour copper gold. He suggested that a more golden lustre might be obtained by sprinkling crushed glass on top of the mixture in the crucible to form a slag which would help prevent the escape of the zinc vapour; in other words, increase the zinc content of the brass.

Biringuccio (ca. 1540) has the next most complete description of brass making. He described how either calamine or furnace tutty could be mixed with broken up pieces of copper and sprinkled with a layer of powdered glass, then heated in a closed crucible for 24 hours.

Figure 4: Georgius Agricola (1490-1555) observed in 1546 that a metal called "zincum" was being produced in Silesia.

Agricola (Figure 4) in 1546 reported that a white metal was condensed and scraped off the walls of the furnace when Rammelsberg ore was smelted in the Harz Mountains to obtain lead and silver to which he gave the name "contrefey" because it was used to imitate gold. This often consisted to metallic zinc, although he did not recognize it as such. He observed, furthermore, that a similar metal called "zincum" was being produced under similar circumstances in Silesia by the local people. Paracelsus (1493-1541) (Figure 5) was the first European to state clearly that



"zincum" was a new metal and that it had properties distinct from other known metals.

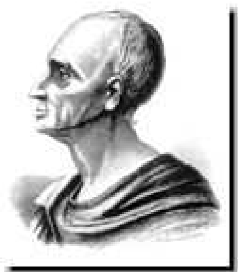


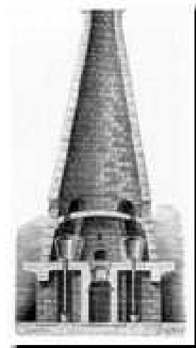
Figure 5: Paracelsus (1493-1541) was the first European to state clearly that "zincum" was a new metal.

Thus, by about 1600, European scientists were aware of the existence of zinc. All the metal they had examined, however, had likely been imported from the East by Portuguese, Dutch and Arab traders. However, there was a profusion of names quite unrelated to the local names for zinc ores. These included tutenag (derived from the Persian tutiya, calamine,which became the English tutty, zinc oxide) and spelter (likely from the similar coloured lead-tin alloy, pewter, or the Dutch equivalent, spiauter or Indian tin which the British scientist Robert Boyle latinised to speltrum in 1690 from which originates spelter, the commercial term for zinc. The word tutia, an old name for zinc oxide, is derived from a Persian word that means smoke and refers to the fact that zinc oxide is evolved as white smoke when zinc ores are roasted with charcoal.

In Renaissance times, latten (or laten, laton, lattyn) became the common English word for brass, akin to the French laiton (= brass) and Italian latta (= sheet brass), and probably based on the Latin latte or lathe (= sheet). The origins of the German word for brass, Messing, may be related to the Latin massa (= lump of metal). The modern English brass may be related to the French braser (= braze or solder). The word "zinc" may be derived from the Persian word sing meaning stone. In Arabic, zinc is known as kharseen, i.e. Khar from Al-Ghar = mine, seen from Al-Seen = China, hence kharseen, the metal from Chinese mines. The spelter trade with the East flourished throughout the seventeenth and first half of the eighteenth centuries, although there seem to be no records concerning the tonnages involved.

Figure 6: Andreas Marggraf (1709-1782) fully described the production of zinc from calamine.

In an extensive research "On the method of extracting zinc from its true mineral, calamine", Andreas Marggraf (Figure 6) in 1746 reduced calamine from Poland, England, Breslau and Hungary with carbon in closed retorts and obtained metallic zinc from all of them. He described his method in detail, thereby establishing the basic theory of zinc production. Marggraf also showed that the lead ores from Rammelsberg contained zinc and that zinc can be prepared from sphalerite. Marggraf was probably unaware that in 1742, the Swedish chemist Anton von Swab (1703-1768) had distilled zinc from calamine and that, two years later, he had even prepared it from blende. Since the vapors rose to the top of the alembic before passing into the receiver, this process was called distillation per ascendum. In 1752 Swab and another Swedish chemist Axel Fredrik Cronstedt (1722-1765) developed at government expense the use of Swedish zinc ores for the manufacture of brass, to avoid the necessity of importing calamine.



The knowledge of deliberate zinc smelting in a retort was acquired by an Englishman on a visit to China just prior to 1740. A vertical retort procedure was developed by William Champion (1709-1789) and by 1743 a zinc smelter had been established at Bristol in the United Kingdom. A charge of calamine and carbon was sealed into a clay crucible having a hole in the bottom. This was luted onto an iron tube extending below the crucible furnace into a cool chamber

below. The closed end of the iron tube sat in a tub of water and it was here that the metallic zinc was collected (Figure 7). The distillation took a total of about 70 hours to yield 400 kg of metal from all 6 crucibles positioned in the furnace. An annual production rate of 200 tons has been suggested for the works at that time.

Figure 7: William Champion's zinc smelting furnace.

This type of apparatus continued to be employed until 1851 although it was fuel inefficient, consuming 24 tons of coal for every ton of spelter produced. In 1758, William's brother, John, patented the calcination of zinc sulfide to oxide for use in the retort process, thereby laying the foundation for the commercial zinc practice which continued well into the twentieth century. The English zinc industry was concentrated in Bristol and Swansea.

The Welsh process was a batch operation which required withdrawing the crucible and retort after each cycle. It was labour intensive and fuel inefficient. A major technological improvement came with the development of the German process by Johann Ruberg (1751-1807) who built the first zinc smelting works in Wessola in Upper Silesia in 1798 which used the horizontal retort process developed by him. The principal advantage of this technique is that the retorts were fixed horizontally into the furnace allowing them to be charged and discharged without cooling. By placing the retorts in large banks, fuel efficiency was greatly increased. The raw material initially used was zinc galmei (calamine), a by-product of lead and silver production. Later, it became possible to produce zinc directly from smithsonite, an easily smelted ore. This was shortly followed by the use of zinc blende, which had first to be converted into the oxide by roasting. After this development, other smelting works were soon erected in Silesia near the deposits, in the areas around Liège in Belgium, in Aachen, in the Rhineland and Ruhr regions in Germany.

The first Belgian plant was built by Jean-Jacques Daniel Dony (1759-1819) in 1805 and also used horizontal retorts but of slightly different design. A larger plant was built in 1810. This was the predecessor of the Societé de la Vieille Montagne which a few years later became the largest zinc producing company in the world.

Zinc production in the United States started in 1850 using the Belgium process and soon became the largest in the world. In 1907, world production was 737,500 tons of which the USA contributed 31%, Germany 28%, Belgium 21%, United Kingdom 8%, and all other countries 12%.

The excellent resistance of zinc towards atmospheric corrosion soon led to its use in sheet production. The possibility of rolling zinc at 100-150¡C was discovered as early as 1805 and the first rolling mill was built in Belgium in 1812. More such mills were built in Silesia from 1821 onwards. Hot-dip galvanizing, the oldest anticorrosion process, was introduced in 1836 in France. This became possible on an industrial scale only after the development of effective processes for cleaning iron and steel surfaces. At first, only small workpieces were zinc coated. Continuous hot-dip galvanizing of semi-finished products and wire came later. In the United States, the rich ore deposits led to rapid growth in zinc production in 1840, so that by 1907, Germany, which had for long been the world's leading producer of zinc, was left behind.

Zinc was produced for about 500 years from its oxide ores which are far less abundant than the sulfides, before the sulfides became the major source of supply. The technology of zinc production changed gradually during the centuries towards a

more pyrometallurgical route. However, this tendency underwent a radical change during World War I when the roasting-leaching-electrowinning process was introduced and in the 1980's, when pressure leaching-electrowinning offered another practical route to zinc production.

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http://www.initiative-zink.de/309.htm

Thomas Wilson, [curator, Department of Prehistoric Anthropology], notes: "(svastika_) is characterized by straight bars of equal thickness throughout, and cross each other at right angles, making four arms of equal size, length and style." While not finding definitive clues as to its time or place of origin, Wilson concludes that the svastika_ was perhaps the first symbol to be made with 'a definite intention' and a continuous or consecutive meaning, the knowledge of which passed from person to person.



The view that the symbol may perhaps have represented a known object, is echoed by Ashley and Butts. H.J.D Ashley wrote: "In the first instance probably the svastika_ may have represented the course of the sun in the heavens revolving normally from left to right." (1925, The Swastika: A study, *The Quest*, January 1925). Edward Butts noted: "…It is evident that the svastika_ figure is only emblematic of what it originally was, from the fact that it must have been a more useful device and of very necessary application to have forced itself into the needs of so many widely distributed localities." [1901, *Statement No.1: The Swastika*, Kansas City, Franklin Hudson Publishing Co.]

Friedrich Max Mueller characterized the symbol with its hooks facing left-ward as suavastika, but there is no corroboration for such a lexeme. Wilson analyzed the occurrence of the symbol on artifacts – from funeral urns to spears – and attempted a classification by physical and symbolic properties to fathom some logic as to why the symbol has been prevalent in so many cultures for so long. It is difficult to surmise that the sign was just ornamental; it had some specific symbolic importance.

Troy. Svastika_ with four birds. [Compare the two ducks shown with the symbol in Cyprus. Source: Dr. Henry Schliemann, 1885, *Tiryns: the prehistorical palace of the kings of Tiryns*, New York, Charles Scribner's Sons]. "According to the migration theory (as opposed to the coincidence theory), the svastika_'s earliest known habitat is a wide territory beginning at the valley of the river Indus in India and extending westward across Persia and Asia Minor to Hissarlik (where the remains of ancient Troy were found) on the shore of the Hellespont…W. Norman Brown contented (1933, The Swastika: The study of the Nazi claims of its Aryan Origin, Emerson Books) that 'for combined age, frequency, and perfect execution, the examples from the Indus Valley are the most interesting.'..Brown noted that the svastika_ was among India's 'first civilized remains, as early as 2500 BCE, possibly 3000 BCE, and appears in forms perfectly developed, in contrast with slightly older but primitive and less

perfect forms found farther westward.' More important, Brown concluded that it existed in India before the arrival of the Aryans. 'Like other symbols which the Aryans of India used on coins and stone sculpture, it came to them from non-Aryan predecessors. It was a simple minutia of the spoils the victors had taken from those they had vanquished.'..The svastika_ was also discovered in the early 1930s in explorations of the ancient civilization in Baluchistan (in Central Asia)…The next chronological stratuth' (as Brown calls it) for the svastika_ appears at Hissarlik, the site of Homer's Troy, and many older cities that had risen and perished before it...According to Brown (and contrary to Schliemann's assertion), it was at Hissarlik or elsewhere in Asia Minor that the Indo-Europeans may for the first time have met the svastika_, but this is only a supposition." (Steven Heller, 2000, *The Swastika: symbol beyond redemption?* New York, Allworth Press, pp. 28-33).

W. Norman Brown who refuted the claim of Indo-European origins of the svastika_ was emphatic that the people who first used the symbol were the 'Japhetic' and the Indus Valley Peoples. "Whatever these various peoples were, they were not Indo-Europeans; and the Indo-Europeans, as far as our evidence indicates, did not know the svastika_ until a thousand years after the time of its earliest preserved specimens." He further adds: "Egypt seems to have been without it (svastika_) until very late, when Greece had arisen. Ancient Assyria and Palestine, as far as I know, were also without it… Although by 2000 BCE it extended across to the Hellespont, it passed to the north of the great Semitic territory and missed that people. The jews did not use it. Early Christianity seems not to have known it. The Christians used the svastika_ only after their religion was well established in Europe."



Many bronze articles with svastika_ sign; Dates: Unknown [Source: Thomas Wilson, *Report of National Museum*, 1894]. Celts who were proficient bronze- and gold-workers also used the svastika_ motif.

Bronze pin-head from the Caucasus





Marks of three svastika_ on black pottery from Caucasus

Fragment of bronze ceinture from Necropolis of Koban, Caucasus

Bronze pin from Bavaria



Footprints of the Feet of the Buddha; note the svastika_ just below the fingers. [Source: Alexander Cunningham, 1962, *The Stupa of Bharhut: a Buddhist monument*, Varanasi, Indological Book House].







Cypriot artifact with svastika_. Note the symbol on the stylized, flower-like

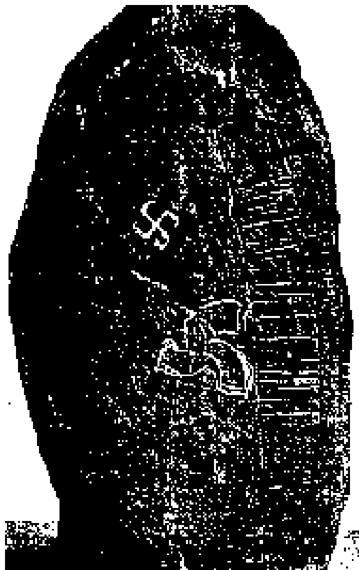
wheel of the chariot.

Ireland. Triskelion on carved wood.



Cypriot artifact with svastika_ flanked by two ducks.

Cypriot artifact with svastika_ on the shoulder of the warrior holding a bull model in his left hand; his hind-part is the hind-part of a bull?





The picture on the left shows a large runic stone bearing an inscription concerning the dead man it commemorates, three interlocked drinking horns, and a sinistroverse meandroid swastika. It was found at Snoldelev, Denmark. Iron spearhead showing runic inscriptions and two closed meandroid swastikas, one of them destroverse, and the other one sinistroverse.
Found at Brest-Litovsk, Russia, probably of Gothic origin, and dated from approximately the third, the fourth, or perhaps even the fifth century B. C.
Swastikas, mostly in its sinistroverse form, but also in its destroverse form, are currently found in weapons.
http://www.intelinet.org/swastika/swasti09.htm



Coin from Crete ca. 1000 BCE.



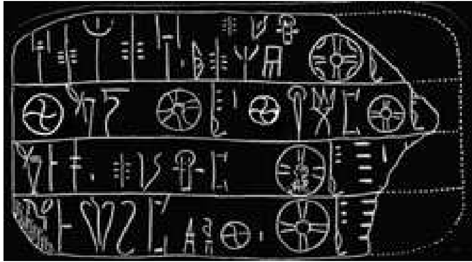
Samara (near Baghdad) 5000 BCE. (Fish and svastika glyphs)





Greek pottery 700 BCE.
Two tigers (jackals?) and two peacocks facing each other. Svastika glyphs shown all around. The lady with outstretched hands wears a skirt with fish glyph on it. (kolli ‘fish’; kola ‘woman’). Head of a bull (?) atop the tiger on the left.

http://www.heathenworld.com/swastika/
Shipwreck, Greek pottery, Ischia Museum / VIII century BC (Fish and svastika glyphs)



Minoan writing,
(Crete) / XIV century BC (Svastika within circles is shown on row 2 and row 4).



Altar, Pyrenees (South of France) /I Century BC (The altar shows a svastika and a fish – both are Sarasvati hieroglyphs.)
http://pagesperso-orange.fr/archeometrie/swastika.htm



EC515. India, Ujjain, Sunga Province, ca 150-75BCE, AE Square Karshapana. Floral device and stylized man/2 swastika symbols, cf. MACW4625-4627.http://www.ancient-art.com/images/ec515.jpg

The Iron Gates gorge, or the Djerdap, is a magnificent gorge system in the Danube River, where it exits from the Hungarian plains.

Photo: http://travel.webshots.com/photo/1015961012029815114XVtKetslHN
Professor Dragoslav Srejović (1931 - 1996) discovered and excavated the sites of Lepenski Vir and Vlasać. "Lepenski Vir" by Dragoslav Srejović (1972) is a masterpiece of an excavation report.



http://donsmaps.com/images/lepenskivirart2.jpg An artist's view of Lepenski c. 8000 yrs. BP.

It is possible that it was a sulphide mineral that was identified as zinc. [main sulfide minerals are chalcocite (copper), and pyrite (iron) with small amounts of molybdenite (molybdenum), sphalarite (zinc) and galena (lead)]. But, it would appear, that the early artisans had the ability to distinguish distinct properties of compounded ores, such as the Zinc-Lead (Zn-Pb) ores of Zawarnala. This is borne out by the semantics related to the hieroglyphs (picture-words matched with the homophones related to mine-work/smithy/mint.

Reading svastika hieroglyph as zinc, zinc retort distillation furnace



This is an addendum to Sarasvati hieroglyph dictionary [http://www.scribd.com/doc/2231860/dictionary], presending notes on zinc (the metallurgical marvel to isolate and capture the eigth metal discovered with the invention by a stroke of genius, a brilliant zinc retort distillation furnace, which led to an astonishing enquiry in Indian alchemical traditions -- see the photograph of the retorts arrayed, displayed in an ancient mining site of Zawar, Rajasthan -- it's alchemy because copper could be made to shine like gold as aara-ku_t.a adding zinc to create the brass alloy) and svastika glyph (which occurs over 50 times on the Sarasvati epigraphs -- so-called Indus script). The svastika hieroglyph represents zinc, a zinc retort distillation furnace. The array of zinc retort distillation units displayed is comparable to the array of four or five 'svastika' glyphs which appear as Sarasvati hieroglyphs on Indus script inscriptions.



V391 V393

Sign 286 seems to ligature sign 267 and sign 391; Sign 355 seems to ligature sign 347

and sign 391 (Sign 391 depicts the opening in the nave or hub of wheel and also six spokes: **ara_**)

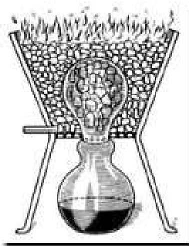


A ligature occurs on a Mohenjodaro seal, m0712:

m0712 1091 Note Sign391 ligatured on the animal's neck.

era, eraka = nave of wheel (Ka.); rebus: era, eraka 'copper' (Ka.) The glyph, 'nave of circle with six spokes': aara 'spokes'; eraka 'nave of wheel'; aara 'iron'; eraka 'copper'; ku_t.a 'summit of mountain'; ku_t.a 'mixing, alloy'. In historical times, brass gets called *pittal.a* which has an expanded semantic homonym: *pittala_t.t.am* See also uploaded my ebook on Indian alchemy. [http://www.scribd.com/doc/2268545/Soma1]No wonder, the vis'vakarma of Bharatam were able to create the wootz steel, the pancaloha murti-s from Swamimalai and also the Sanchi (now Delhi) iron pillar, apart from a hieroglyph, *s'rivatsa*, adorning a torana..





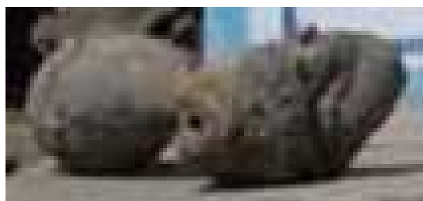
Zinc retort distillation furnaces, to add to copper to create the alloy, brass – corrosion-resistant, strong alloy, a fore-runner of the industrial revolution. Ancient zinc smelting site, Zawar mines, south of Udaipur.

http://www.indogold.com.au/assets/images/photos/album/C7.jpg See lexemes: bakayantra 'crane-instrument'; name of a particular retort ; ka_cabakayantra 'a glass retort' (Skt.) The cognate kancu, kamsya indicates the possibility of such a retort

having been used to create distillates of metals using a retort furnace. Tiryakpa_tana ‘a kind of process applied esp. to mercury’; tiryakpa_tin ‘falling obliquely on (loc.) (S’is.X.40); tiryaksu_tra ‘a cross-line’; tiryakks.ipta ‘placed obliquely’ (Skt.) The prefix tiryak- may be derived from: S. *rimau* ‘to ooze’, *rimio* ‘leaky’, *rimrimi* f. ‘dripping’; L. *trimma* ‘to drop, distil, leak’, *trimmo* f. ‘leaking, distillation’. (CDIAL 6039). **āgrayaī—** f. ‘oblation of first fruits’ KātyŚr., *āgrayaá—* ‘the first soma libation at the Agnioma sacrifice’ VS.A. *āgani* ‘first distilled, strong’ (CDIAL 1052). s’ucy ‘to distil’; s’cut ‘to cause to drop or flow , shed S’Br.’ Pa_n. 7-4 , 61 Sch. Dha_tup. iii , 4 Dha_tup. xv , 6. a_su ‘to distil’ (RV 9.108.7) gad. ‘to distil or drop, run as a liquid’ (Dha_tup. 19.15); gad.ayati ‘to cover, hide’ (Dha_tup. 35,84).

asmadryaJc ‘turned towards us RV. vii , 19 , 10**’ kadryaJc ‘**turned towards what? RV. i , 164 , 17.**’nyaJc ‘**going or directed downwards , bent down’ RV. **tiryaJc** mfn. (fr. {tiras} +{aJ} Pa_n. 6-3 , 94 ; nom. m. {-ryaG} n. {-ryak} f. {-raizcI} , also {-ryaJcI} Vop. iv , 12) going or lying crosswise or transversely or obliquely , oblique , transverse (opposed to {anv-aJc}) , horizontal (opposed to {Urdhva}) AV. VS. TS. &c. ; going across S’Br. xiv , 9 , 3 , 2 f. ; moving tortuously W. ; curved , crooked W. ; meandering W. ; lying in the middle or between (a tone) , xi , 4 , 2 , 5 ff. VPra1t. i , 149 ; m. n. `" going horizontally "' , an animal (amphibious animal , bird , &c.) Mn.v , 40 ; xii , 57 Yajn5. MBh. &c. [448,1] ; the organic world (including plants) Jain. ; n. = {-ryak-pramANa} S3ulbas. ; f. the female of any animal W. ; (%{rya4k}) ind. across , obliquely "' , transversely , horizontally , sideways S3Br. KatyS’r. SankhSr. VPrat. Mn. &c. ; ({-razcA4}) instr. ind. id. RV. i , 61 , 12 ; ii , 10 , 4 ; x , 70 , 4 ; ({-razci4}) loc. ind. id. S3Br. ii , 3 , 2 , 12 KatySr. xvii , 8 , 14 and 12 , 1. supratyaJc ‘well turned back’; yadriyaJc ‘moving or turning in which direction, reaching whither’; samyaJc ‘turned together or in one direction’; pratyaJc ‘moving in an opposite direction’. Br. KatySr; nyaJcita ‘bent down’; paryaJc ‘to turn about or round, revolve (RV 10.119.5)

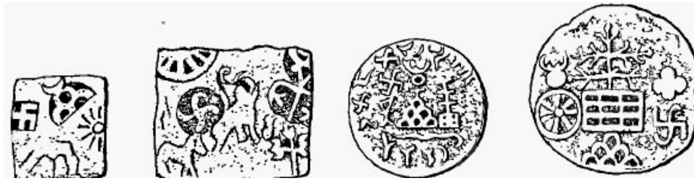
These semantics indicate the possible reason for the invention of the glyph ‘svastika’ with two transverse arms (moving either clock-wise or anti-clockwise – both types of glyphs occur on Sarasvati hieroglyphs).



Zinc retort. Ancient smelting site mear Zawar mines, Rajasthan. Compare the retor distillation units shown at Zawar (in the above picture) with the following schematic of *tiryakpatana yantra* for distillation of zinc (*Rasaratnasamuccaya*). [quote] In the Rasaratnasamuchhaya a very famous Indian text on alchemy composed in 13AD, mentions many ancient Indian (pre christian era) alchemists like Nagarjuna, Govinda. It also mentions many ancient types of instruments, furnaces, bellows, retorts for extracting the metals from the ores and smelting. The Tirakpatana yantram(distillation by descending machine) was used for distillation purposes. It also mentions an ancient zinc production factory at Zawar(Rajahstan; located 24° 21' N; 73° 41'E) and situated about 40km of Udaipur. In the early 1980's it was excavated and studied by the British Museum, MS university and Hindustan Zick limited. Zinc smelting was done in small cylindrical retorts (about 30 cm long and 10 cm in diameter) and the vapour was distilled from

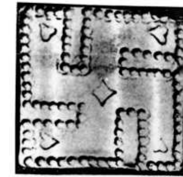
the charged retorts by placing them in the furnace in a vertically inverted position. The furnaces were found in two parts consisting of a zinc vapour condensation chamber at the bottom and a furnace chamber at the top. These are separated by a perforated terracotta plate measuring 65 X 65 X 20cm. As many as 36 charged retorts were arranged inverted vertically on the perforated plate. From the condensation funnel tubes, luted with retorts, which were inserted through the perforated plate, zinc vapour was collected in vessels in the lower chamber and condensed.

Svastika_ symbol used in historical periods



Ancient coins of Bharat with svastikas, normal and ogee (After Figs. 231 to 234 in Thomas Wilson, opcit). The coins were found by Cunningham at Behat near Shaharanpur. E. Thomas assigns them to about 330 BCE. (Edward Thomas**,** *Jour. Royal Asiatic Soc. (new series),* I, p. 175). The svastika sign does not appear in Indo-Bactrian (ca. 300 to 126 BCE), Indo-Sassanian (from 200 to 636 CE) or later Hindu or Mohammedan coins. The sign of svastika becomes an integral part of the temple architectural tradition and becomes a sacred symbol of the Hindu, Buddha and Jaina traditions.





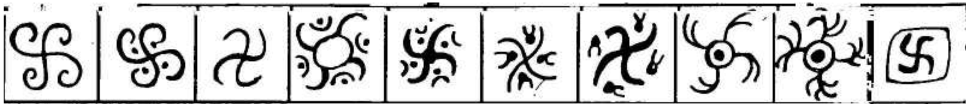
Stone toilet tray, Sirkap, Taxila, Stratum II (pl. g = No. 246, Marshall);

Gold amulet, Svastika_, 1st cent. CE, Sirkap, Taxila (Pl. 191, No. 85, Marshall).

Copper seal, svastika_, Sirkap, Taxila, stratum II, legend indistinct, pl. 55 no. 27, Marshall).

BHIMBETKA	ROCK-SHELTER PAINTING
"	"
HARAPPA (HARAPPAN CULTURE)	SEAL + SEALING
MOHENJODARO (HARAPPAN CULTURE)	"
RANGPUR MALWA WARE (CHALCOLITHIC)	POTTERY
DIST. COORG DIST. COIMBATOR (MEGALITHIC)	"
PRAHLADPUR (SUB PERIOD I A) RUPAR (PERIO V)	SEAL + SEALING
TAXILA	DIFFERENT OBJECTS
BHAJA, KUDA, KĀRLE, JUNNAR NASIK	CAVE INSCRIPTION

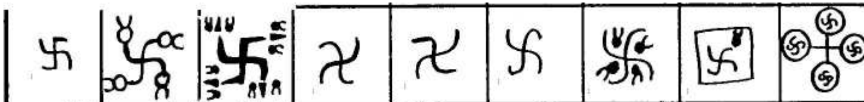
[Pl. 27, Svastika_ symbol: distribution in cultural periods]



[Pl. 28, A, Ramnagar, Lotapur, Mamdar, Singavaran: Punch-marked coins]

B	NAGARI FINDS.	"
C	KAUŚĀMBĪ	UNINSCRIBED + INSCRIBED CAST COPPER COINS
D	KADA	COPPER COINS
E	ERAN	COPPER PUNCH-MARKED COINS

[Pl. 28, B to E: svastika_ symbol on punch-marked/cast copper coins]



[Pl.28, F: Ujjayini, copper coins with svastika_ symbol]

TAXILA	"
AYODHYA	"
ARJUNAYANA SIBIS KUNINDA KULUTA YAUDHEYA	"
SĀTAVĀHANA	COINS

[Pl. 28, G to J, Taxila, Ayodhya, Arjunayana, Sibis, Kun.inda, Kuluta, yaudheya, S'a_tava_hana coins: Svastika_ symbol]

Standing male, dotted circles, portable furnace, Tree and Svastika, Elephant and Svastika glyphs on Srilanka punch-marked coins
Sri lanka ancient coins (Association of the svastika with a tree glyph or an elephant glyph can be traced back to the evidence from Sarasvati epigraphs (Indus script inscriptions):

Ancient Lanka - Tree and Svastika

Six Compartments - Right

A circular copper-lead coin with a six branched tree within enclosure of six compartments on obverse and a railed svastika revolving to right (clockwise) on the reverse.

SPECIFICATIONS
Alloy Cu-Pb?
Type Cast ?
Diameter 12.1 mm
Thickness 1.3 mm
Weight 0.77 gms
Shape Round
DieAxis O°



#

Obverse : A six branched tree within enclosure of six compartments in two rows of three each.
Reverse : A Railed *svastika* revolving to right (clockwise).
http://www.lakdiva.org/coins/ancient/tree06c_rsvastika.html

Ancient Lanka - Tree and Svastika

Eight Compartments - Left

A circular copper-lead coin with a Six branched tree within enclosure of Eight compartments on obverse and a railed svastika revolving to left (anticlockwise) on the reverse.

SPECIFICATIONS	
Alloy	Cu-Pb?
Type	Cast ?
Diameter	15.4 mm
Thickness	1.8 mm
Weight	1.9 gms
Shape	Round
DieAxis	O°



#

Obverse : A six branched tree within enclosure of eight compartments in two rows of four each in a dotted circular border.
Reverse : A Railed *svastika* revolving to left (anti-clockwise) in a dotted circular border.
http://www.lakdiva.org/coins/ancient/tree08c_lsvastika.html

Ancient Lanka - Tree and Svastika

Twelve Compartments - Left

A circular copper-lead coin with a four branched tree within enclosure of twelve compartments on obverse and a railed svastika revolving to left (anticlockwise) on the reverse.

SPECIFICATIONS	
Alloy	Cu-Pb?
Type	Cast ?
Diameter	13.7 mm
Thickness	1.7 mm
Weight	1.02 gms
Shape	Round
DieAxis	O°



#

Obverse : A four branched tree within enclosure of twelve compartments in three rows of four each. The end of branch which is visible splits into three.
Reverse : A Railed *svastika* revolving to left (anti-clockwise). Unidentified symbols to left and right.
http://www.lakdiva.org/coins/ancient/tree12c_lsvastika.html

Ancient Lanka - Tree and Svastika

Twelve Compartments - Right

A large circular copper-lead coin with a four branched tree within enclosure of twelve compartments on obverse and a railed svastika revolving to right (clockwise) on the reverse.

SPECIFICATIONS

Alloy	Cu-Pb?
Type	Cast ?
Diameter	25.3 mm
Thickness	3. mm
Weight	5.82 gms
Shape	Round
Edge	Rough
DieAxis	180°



#

Obverse : A four branched tree within enclosure of twelve compartments in three rows of four each. The end of each branch splits into three leaves. Unidentified symbol to left and right.



Reverse : A Railed *svastika* revolving to right (clockwise). Unidentified symbol to left and right.

http://www.lakdiva.org/coins/ruhuna1/tree12c_rsvastika_bg.html

A tree and swastika coin



The reverse of the tree and swastika coin



An elephant and swastika coin

The reverse of the elephant and swastika coin

Anuradhapura - Elephant and Svastika

A fragment small rectangular(?) cast copper coin with a elephant standing facing right on obverse and a railed Svastika on the reverse. Found at various archaeological sites in Anuradhapura and Jaffna.

SPECIFICATIONS

Alloy	Cu
Type	Cast



Height 11.7 mm
Width 14.5 mm
Thickness 2.0 mm
Weight1.03 gms
Shape fragment
DieAxisO°

Codrington #10; OBRW H.21?

Obverse : Elephant standing facing right with trunk pendent, (in a single line frame).
Reverse : Railed Svastika revo;ving left (not very clear)
Bopearachchi and Wickremesinhe in *Ruhuna, An Ancient Civilization Re-visited* illustrates four copper coins from Akurugoda of similar type H.19 to H.22 (12-15 mm, 0.5-2.0 gms). http://www.lakdiva.org/coins/ancient/elephant_svastika_small.html
The circular Elephant and Svastika coins were mainly found at the Abhayagiri Dagoba in Anuradhapura. It is the Classic and largest of the ancient coins which is uniquely from Lanka.

All of the Elephant and Svastika coins illustrated in Parker; Codrington; Mitchiner; Seyone; Bopearachchi and Wickremesinhe have a prominant triple arch *Chitaya* symbol under the railed Svastika on reverse.



Obverse : Elephant walking to the left with trunk extended and tail ending in a triple fork (not visible). Above are four symbols

A	Just above Elephant	The *life* symbol -|<|
B	On Top	The Svastika revolving right (partly visible) mounted on a staff and surrounded by a railing indicated by four vertical lines rising from a horizontal line.
C	On upper left	Tree with three-Branches (not visible) each ending in a triple fork in a enclosure, divided into four compartments by a vertical and a horizontal line.
D	On upper right	*Chitaya* of three small cells, the two bottom ones are contiguous (off flan).
C	On lower right	Inverted Tree with three-Branches each ending in a triple fork in a enclosure, divided into four compartments by a vertical and a horizontal line.

Reverse : four symbols arranged

A	On Top	The railed Svastika revolving right.
B	Below	The usual *Chitaya* of three arches is **NOT seen** beneath a horizontal line. A number other distinct symbols with loops including a *Ankusa*(Elephant Goad).
C	To left	*Nandipada* symbol.
D	To right	The hour glass-like symbol i.e. O0E tilted, with triple-dot symbols on either end.

http://www.lakdiva.org/coins/ancient/elephant_svastika_struck.html

Century 3rd BC to 1st AD - Lanka

Ruhuna - Elephant and Svastika - Cast

The cast Elephant and Svastika coins are recent finds at Akurugoda near Tissmaharama in south east Lanka and are thick and rough casts. The thin and finely Struck coins of same type were mainly found at the Abhayagiri Dagoba in Anuradhapura. It is the Classic and largest of the ancient coins which is uniquely from Lanka.

SPECIFICATIONS

Alloy Copper

Type



Cast

Diameter 30.7 mm

Thickness 3.2 mm

Weight14.2 gms

Shape round

DieAxisO°

Obverse : Elephant walking to the left with trunk extended and tail ending in a triple fork, occupying the whole of the base. Above are four symbols

A	Just above Elephant	The *life* symbol |>|=
B	On Top	The Svastika revolving left or right mounted on a staff and surrounded by a railing indicated by four vertical lines rising from a horizontal line.
C	On upper left	Tree with three-Branches each ending in a triple fork in a enclosure, divided into four compartments by a vertical and a horizontal line.
D	On upper right	*Chitaya* of three cells, the two bottom ones are contiguous.

Reverse : four symbols arranged

A	On Top	The railed Svastika revolving left or right.
B	Below	*Chitaya* of three cells, the two bottom ones are divided by space, beneath a horizontal line.
C	To left	The hour glass symbol i.e. |>|<| upright.
D	To right	*Nandipada* symbol.

The description of seven these coins (H.1 to H.7) found in Akurugoda and cataloged in 1999 by Osmund Bopearachchi and Rajah Wickramasinhe in the book *Ruhuna. An Ancient Civilization Re-visited* .

http://www.lakdiva.org/coins/ruhuna/elephant_svastika_cast.html

Ruhuna - Lion and Svastika

The Lion and Svastika lead coins are rare recent finds at Akurugoda near Tissmaharama in south east Lanka.





SPECIFICATIONS

Alloy Lead
Type Cast
Diameter 16.4 mm

Thickness 3.5 mm

Weight2.76 gms
Shape round
Edge rough
DieAxis150°

Obverse : Lion jumping to the right with arched back and front legs stretched forward. Three heaped chitya below. Parts of few Brahmi text characters visble
Reverse : Railed svastika revolving to right (clockwise) at center of coin. Brahmi text characters visble all around periphery.
Ten lion and svastika lead coins (**E.1-E.10**) with sizes 7 to 25 mm and weights from 0.5 to 7 grams that were found in Akurugoda are cataloged in 1999 by Osmund Bopearachchi and Rajah Wickramasinhe in*Ruhuna. An Ancient Civilization Re-visited* .

SEALINGS

KING SADDHATISSA



Fig I



RUHUNA ROYALTY



Fig II Fig III

http://www.lakdiva.org/coins/ruhuna1/ruhuna1_lion_svastika_pb.htm



Ancient clay stamp seals and sealings have reportedly been found in Sri Lanka.
http://www.freerepublic.com/focus/f-news/1074122/posts

http://www.cbsl.gov.lk/info/03_about/a_8.htm#1
http://swastika-info.com/en/startpage/srilanka/1067686584.html
Glyptic art themes which parallel the Sarasvati hieroglyphs are found on early punch-marked coins (Dilip Rajgor, 2001, Punch-marked coins of early Historic India, California, Reesha Books International) and on Pallava coins (R. Krishnamurthy, 2004, The Pallava Coins, Chennai, Garnet Publishers). Some of these themes are:



Svastika
The finds of Pallava coins at Dvaravati of Thailand also attest to the continuing maritime tradition which began with the Sarasvati civilization

High quality zinc alloys and zinc sheets have been found in ancient India. At Pratkashe, two copper objects containing 25.86 and 17.75% ink has been found in 2000BC. In the prehistoric Harappan civilisation copper bronze artefacts to 6% zinc were found.

About 20 miles north of Rawalpindi of modern Pakistan, brass objects(two bangles, one vase and pot) dated to around 300BC contained 34.34% of zinc. A chariot found in the lost city of Dwarika(4000-6000BC) contained 10.68% zinc. Similarly, scores of brass items of items of Buddha, coins and caskets had some 17-25% zinc.

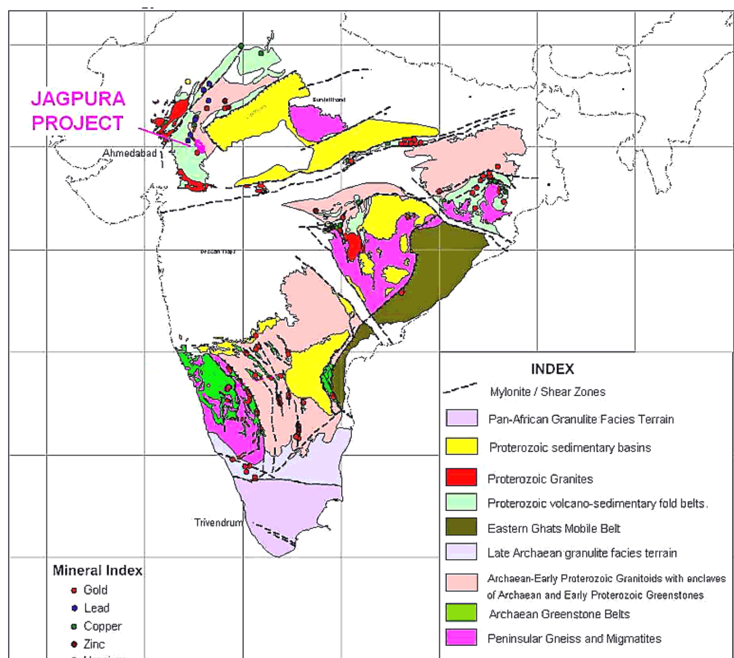
In fact an entire roll of sheet zinc at Agora in Athens in 300-400BC was found. And the Greeks were not producing zinc, and as we have ample evidence that it was produced in India, it can only be assumed they obtained these sheets from India. [unquote]

http://www.abovetopsecret.com/forum/thread111071/pg7



“Zinc alloys have been used for centuries, as brass goods dating to 1000-1400 BC have been found in Palestine and zinc objects with 87% zinc have been found in prehistoric Transylvania…the Hindus were aware of the existence of zinc as a metal separate from the seven known to the ancients.”
http://www.redorbit.com/modules/reflib/article_images/28_66bc72775f3eb8353bc01ba3c861703a.jpg
Brass was used in Lothal and Atranjikhera in the 3rd and 2nd millennium BCE.
“Among the old workings for zinc, the Zawar complex of Rajasthan in Western India is the most famous. Impressively abundant traces of old workings extend all over the 25 km mining belt and go down to a depth of 90 m below surface. It is claimed that the Zawar miners went up to depths exceeding 150m. The miners perhaps used wooden ladders, scaffolds and launders to drain water in the mines. The wooden samples of two such mines each at Zawar and at Mochina have been dated by ^{14}C. These dates certainly suggest that in the second half of first millennium BCE extensive mining and smelting of lead-zinc ores were done in western India and perhaps the metal was supplied for various regions for coins and other objects. The earliest dates we have for zinc distillation are from a white heap, which is of the 12th century AD.”
http://www.infinityfoundation.com/mandala/t_pr/t_pr_khara_zinc_frameset.htm
KTM Hegde and Ericson, J.E., 1985, Ancient Indian Copper Smelting Furnaces, in: *Furnaces and Smelting Technology in Antiquity*, ed. P.T. Craddock, Occasional Paper No. 48, British Museum, London, pp. 59-67: The survey covered six ancient copper ore mining and smelting sites in the Aravalli (Arbuda) hills extending over a thousand kms.: Khetri and Kho Dariba in NE, Kankaria and Piplawas in the Central part and Ambaji in SW.. A large majority of mine-pits measure 7-8 metres in dia. and 3-4

metres deep showing evidence of fire-treating of the host rocks on the mine walls to widen rock joints. The evidene indicated probable mining in the chalcolithic period. Timber supports recovered from a gallery at a depth of 120 metres at Rajpura-Dariba mines in Udaipur District were radio-carbon dated to 3120+_ 160 years before the present (1987). This correlates with the zinc-containing copper artefacts of Atran~jikhera.
“The Arthasastra describes the production of zinc. The Rasaratnakara by Nagarjuna describes the production of brass and zinc. There are references of medicinal uses of zinc in the Charaka Samhita (300 BC). The Rasa Ratna Samuccaya (800 AD) explains the existence of two types of ores for zinc metal, one of which is ideal for metal extraction while the other is used for medicinal purpose. It also describes two methods of zinc distillation.” see: Craddock, P.T. *et al.*, Zinc production in medieval India, World Archaeology, vol.15, no.2, Industrial Archaeology, 1983.



http://en.wikipedia.org/wiki/History_of_metallurgy_in_the_Indian_subcontinent

“An ingenious method was devised of downward distillation of the zinc vapour formed after smelting zinc ore using specifically designed retorts with condensers and furnaces, so that the smelted zinc vapour could be drastically cooled down to get a melt that could solidify to zinc metal.” http://www.tf.uni-kiel.de/matwis/amat/def_en/articles/metallurg_heritage_india/metallurgical_heritage_india.html
“Lead isotope analyses undertaken by the author on a zinc ingot with a 4th century Deccan Brahmi inscription (previously exhibited in Science Museum, London, courtesy Nigel Seeley) corroborated a likely Andhra Deccan provenance, making it one of the earliest known surviving examples of metallic zinc in the world.” (Srinivasan, S. 1998. “Highlights of ancient south Indian metallurgy-technical evidence for the early use of high-tin bronzes, high-carbon steel, metallic zinc, smelting of bronze and cast images*, Proceedings of the Fourth International Conference on the Beginning of the Use of Metals and Alloy (BUMA-IV),* pp. 79-84. Matsue: Japan Institute of Metals).
http://www.indianscience.org/projects/t_pr_srinibook2.shtml
The Aravallies Belt in Rajasthan is host to a number of major base metal deposits, including the world class, open pit deposit of Rampur Agucha (62 Mt @ 13% Zn and

2% Pb resource). The Khetri deposit in Western Rajasthan contains 24 Mt @ 1.2% Cu and 1.5g/t Au. http://www.indogold.com.au/rajasthan_mineralresources.htm

Geological map of India showing gold, lead, copper, zinc, uranium mineral locations. http://www.indogold.com.au/fig_1.htm

The early meaning of svastika as a glyph

This note reviews the evidence of the use of svastika as a glyph throughout the ancient world for over 3 millennia. The conclusion is that it connotes an object, a mineral – zinc (maybe, in its zinc oxide form called calamine). Brass was an alloy of copper and zinc and was known even before zinc was sublimated and discovered; by melting copper with calamine, brass which was a relatively easy material to cast (at a melting point of about 900 degrees C) with a yellow color comparable to the color of gold was produced. This decipherment is consistent with the occurrence of svastika glyph in the following contexts:

together with an endless-knot glyph (mer.ed 'iron'; rebus: mer.hao 'twisted');
together with the glyphs of a tiger looking back and an elephant [(kol krammara 'alloy smith'; rebus: kol 'tiger', krammara 'turning back'); (ib 'iron'; rebus: ibha 'elephant')]
together with a drummer glyph
Syracuse coin showing Arethusa at the center of a svastika
together with ducks in a Cyprus artifact (shown in Annex 1)
spearhead from Germany (shown in Annex 1)

Depiction of four or five svastika glyphs is an indication of the number of parts of zinc mixed with, say, eight parts of copper to create different types of hard or soft brasses (high brass has 35% zinc; low brass has 20% zinc), including arsenical brasses or lead brasses. They are also combined with iron, silicon and manganese to increase wear and tear resistance. An alloy called Corinthian brass, an alloy of gold, silver and copper, was known in ancient times. (In later technological developments, zinc is used to galvanize steel to prevent corrosion). "Before the discovery of zinc metal in India (made by the distillation route) sometime during the fifth-fourth century BC, brass could be made, as in Lothal and Atranjikhera, only by the cementation route in which one of the following was smelted along with copper ore : zinc ore, sphalerite concentrate or the roasted product, philosopher's wool or zinc oxide. The traditions of making philosopher's wool and cementation brass could have persisted even after the discovery of the distillation process of making zinc… the distillation route of making zinc and alloying this with molten copper was the only way of making high-zinc (more than 28%) brass, such as the 4th century BC Taxila vase (34.34% zinc)" (Arun Kumar Biswas, Zinc and related alloys, http://metalrg.iisc.ernet.in/~wootz/heritage/zn.html

"References to Zinc and brass are found in the lost text Philippica or Theopompus (4th century BC), quoted in Strabo's Geography (XIII, 56): "There is a stone near Andreida (north west Anatolia) which yields Iron when burnt. After being treated in a

furnace with a certain earth it yields droplets of false silver. This added to copper, forms the so-called mixture, which some call oreichalkos." This pertains probably to the process of downward distillation of zinc ("droplets of false silver") and its subsequent mixing with Copper to make brass oreichalkos (arakuta in Kautilya's Arthasastra) described in detail in the post-Christian era Sanskrit texts." http://www.vanderkrogt.net/elements/elem/zn.html Caraka Samhita has references to medicinal uses of zinc(300 BCE).

A remarkable account of the use of svastika in ancient periods and conclusion that the glyph connoted an object is provided in: Thomas Wilson, 1896, *The Svastika_. The earliest known symbol, and its migrations; with observations on the migration of certain industries in prehistoric times,* Washington DC, The Smithsonian Institution, US National Museum, Washington DC.

Elsewhere, the entire corpus of Sarasvati hieroglyphs (Indus script epigraphs) has been deciphered as related to the repertoire of a smith and smithy. Consistent with this decipherment, the early meaning of svastika as a glyph is presented as a hieroglyph, read rebus: satva, 'zinc' (Pkt.) **satavu, satuvu, sattu** = pewter, zinc (Ka.) **dosta** = zinc (Santali) **jasta** = zinc (Hindi) **jasada, yasada, yasadyaka, yasatva** = zinc (Jaina Pali). Homonyms to denote the glyph are: **sathiya_** (H.), sa_thiyo (G.); satthia, sotthia (Pkt.) = svastika_ sign.

Many hieroglyphs (including svastika and endless-knot motifs) become metaphors of wealth as shown in the use on ashtamangala necklace and on archways hoisted with s'rivatsa glyph. (Details provided in notes on decipherment of Sarasvati hieroglyphs). Svasti which is derivable as su + asti in Sanskrit grammar is explained as a metaphor for 'welfare, auspiciousness' by the depiction of the glyph on temple doors, during the historical periods. The rationale for using the glyph to connote welfare is that zinc as an additive to create an alloy of copper called brass, produced a metal which was 'as good as gold', that precious metal called soma 'electrum'.

That zinc – represented by the hieroglyph, svastika -- was a traded commodity together with other minerals is apparent from the finds of epigraphs containing Sarasvati hieroglyphs at locations such as Altyn Depe. Swat, Seistan.

The burden of this monograph is that this 'object' was in fact, zinc, a commodity traded and used for alloying with copper, to create brass. This alloy has alchemical overtones as discussed in Kalyanaraman, 2006, *Indian Alchemy: Soma in the Veda*, Delhi, Munshiram Manoharlal.

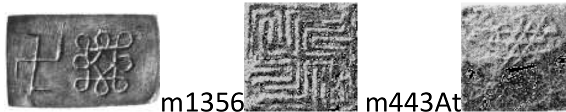
Svastika, the earliest known symbol

An interesting point is that some scholars agree that the model for the symbol of svastika_ must have been an object, known and useful throughout the ancient world. [Thomas Wilson, 1896, *The Svastika_. The earliest known symbol, and its migrations; with observations on the migration of certain industries in prehistoric times,* Washington DC, The Smithsonian Institution, US National Museum,

Washington DC]. See notes at Annex 1 (Svastika and Endless-knot motifs) The annex also shows the picture of a special furnace for making bangles. The lid is stamped with a glyph, apparently before firing.

Our hypothesis is that the traders with their seals, and people who travelled in Swat and Seistan, in search of minerals, were the bronze-age smiths and lapidaries of Meluhha.

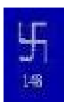
Association of svastika with endless-knot motif on epigraphs



m1356 m443At m443Bt The svastika glyph is associated with endless-knot glyph; the endless-knot glyph appears on a copper plate epigraph, indicating that both glyphs may connote the products made by metal-workers or equipment/processes involved in metal-work. **mer.hao** = v.a.m. entwine itself; wind round, wrap round roll up; mar.hna_ cover, encase (H) (Santali.lex.Bodding) Rebus: **me~e.he~t** = iron (Santali)

The seals m443 and m1356 show the endless knot motif together with the svastika_ glyph. The semantics connoted: **me.rha**, 'twisted; leader, merchant's clerk, **med.h**'; svastika_, 'caravan'; the Sumer cylinder seal impression showing a chariot-rider and a caravan, by adding the endless knot motif as a semantic determinant is a depiction of a merchants' caravan, **med.h svastika_.**

This interpretation is suggested because the des'i_ phonemes for svastika_ are: suvatthi, sotthi = well-being (Pali)(CDIAL 13913). sa_thiyo = auspicious mark painted on the front of a house (G.)(CDIAL 13917). svastika_ is the emblem of the seventh deified teacher of the present era (Jainism)(G.lex.)



The symbol or the word, 'svasti' becomes an invocatory message on many epigraphs of the historical periods in Bha_rata.

Terracotta stamp seal, Taxila, c. 1st cent. CE. [After Parpola, 1994, fig. 4.6]





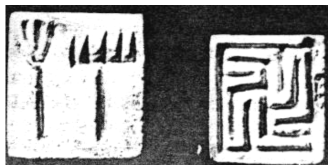
Mcmohan  cylinder seal with six signs, found in 'Swat and Seistan', unrolled photographically and the unbroken stamp-end of the seal; positive impression of the cylinder showing Harappan inscriptions (Robert Knox, 1994, A new Indus Valley Cylinder Seal, pp. 375-378 in: *South Asian Archaeology* 1993, Vol. I, Helsinki) The triangle motif is similar to the motif shown on M-443B.

"The Seistan findspot of this seal is of great interest. Evidence exists for the movement of Indus commodities, and, therefore, Indus commercial activities in the

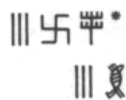
direction of western Asia and, in return, from there to the Indus world.Evidence for the Harappan penetration of Seistan and farther to southeastern Iran is scanty but includes at least one other Indus inscription from an impression of a sherd discovered at Tepe Yahya, period IV A (c. 2200 BC) (Lamberg- Karlovsky and Tosi 1973: pl. 137)" (Knox, p. 377).

Paul Amiet suggests an Iranian origin for the svastika motif. [Paul Amiet, 1961, *La glyptique Mesopotamienne Archaique,* Paris]

Two seals found at Altyn-depe (Excavation 9 and 7) found in the shrine and in the 'elite quarter'. V.M. Masson, Seals of a Proto-Indian Type from Altyn-depe, pp. 149-162; V.M. Masson, Urban Centers of Early Class Society, pp. 135-148; I.N. Khlopin, The Early bronze age cemetery in Parkhai II: The first two seasons of excavations, 1977-78, pp. 3-34 in: Philip L. Kohl (ed.), 1981, *The Bronze Age Civilization in Central Asia*, Armonk, NY, ME Sharpe, Inc. "The discovery in Altyn-Depe of a proto-Indian seal with two signs deserves special mention. V.M. Masson pointed out, that what the seal depicted was a pictogram and not just a representation of animals. In his opinion this means that some of the ancient residents of Altyn-Depe were able to read this text."(G. Bongard-Levin, 1989, Archaeological Finds in Central Asia throw light on Ancient India, Jagdish Vibhakar and Usha Gard (Eds.), *Glimpses of Ancient India through Soviet Eyes*, Delhi, Sundeep Prakashan).



Text 4500 (Incised miniature tablet; not illustrated).

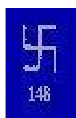


Thus, a svastika appears together with an elephant or a tiger.The 'svastika' is a pictorial and also a sign

Svastika_: A marker of Bronze-age civilization in Bha_rata; its significance in the context of bronze-working in Bha_rata with parallel imageries of Cyprus

mer.ha = twisted, crumpled, as a horn (Santali.lex.) **meli, melika** = a turn, a twist, a loop, entanglement; **meliyu**, melivad.u, meligonu = to get twisted or entwined (Te.lex.) [Note the endless knot motif].

The seals m443 and m1356 show the endless knot motif together with the svastika_ glyph. The Sumer cylinder seal impression showing a chariot-rider and a caravan, by adding the endless knot motif (figure shown in a later section) as a semantic determinant is a depiction of iron and zinc: **med.h, satthiya .**



Sign 148 Glyph:

There are over 50 inscribed objects with just the svastika_ pictorial motif.

In the Punjab, the mixed alloys were generally called, **bharat** (5 copper, 4 zinc and 1 tin). In Bengal, an alloy called **bharan** or **toul** was created by adding some brass or zinc into pure bronze. Sometimes lead was added to make it soft.

Arethusa and svastika_

Svastika_ is a dominant glyph among the epigraphs of Sarasvati Civilization. Over 50 inscribed objects depict this glyph.

That the head of Arethusa is imprinted on a tin ingot and on a Greek coin in the middle of a svastika_ glyph is a pointer to the decoding of the true meaning of svastika_ glyph. The morpheme which occurs in Kannada may hold a key to this decoding: **satavu, satuvu, sattu** = pewter, zinc (Ka.) **dosta** = zinc (Santali) **jasta** = zinc (Hindi) **jasada, yasada, yasadyaka, yasatva** = zinc (Jaina Pali) **ruhi-tutiya** (Urdu) **tuttha** (Arthas'a_stra) **totamu, tutenag** (Te.) **oriechalkos** (Gk.)

Homonyms are: **sathiya_** (H.), sa_thiyo (G.); satthia, sotthia (Pkt.) = svastika_ signcf. svastika ‘meeting of four roads’ (Sk.) svastika the meeting of four roads; the crossing of the arms, making a sign like the cross (Skt.lex.) canti the cross roads, junction of three or more roads (Tirumuru. 225); cantikkarai junction where several roads meet (Ta.lex.)

A copper additive, **'tin or arsenic or zinc’** creates the alloy bronze/brass.

In early cementation processes roasted zinc ore (oxide) was mixed with copper fragments and charcoal (reducing agent) and the mixture was heated in a sealed crucible upto 1000 degrees C. The zinc vapour dissolved to yield a quality of brass. Examples of brass have been found in Lothal and Atranjikhera (6.28 to 16.2 % zinc) dated to c. 3rd and 2nd millennia BCE respectively. Carbon 14 dates (uncalibrated) for the Zawar mines of Rajasthan (40 kms. south of Udaipur) are PRL 932, 430+100 BCE and BM 2381, 380+ 50 BCE. Mining of lead zinc ores are found in the old workings at Rajpura-Dariba (375 BCE) and Rampura-Agucha (370 BCE) . At Prakashe, a Chalcolithic site (2nd millennium BCE) in Deccan, two copper objects each containing 25.86 and 17.75 percent zinc have been found. A vase found at Bhir mound (3rd cen. BCE), Taxila contained 34.34% zinc. A part of chariot in submerged Dwarka assayed 10.68% zinc (unknown date); many copper coins and many bronze images of historical periods contain upto 25% zinc. Silver used in many punch-marked coins was obtained from Zawar mines which yielded copper, zinc, lead and silver.

On coins from Syracuse the head of Arethusa was often portrayed (ca. 500 BCE). This girls' head has often a net in her hair and is usually surrounded by fish. Arethusa coin from Syracuse, 4th cent. BCE **Arethusa is a water divinity, as**

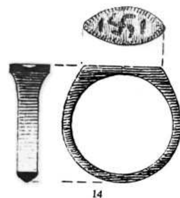




shown by the four fish circling around; she wears a diadem of beads.
Arethusa on a Greek coin [c. 510-490 BCE] The coin shows the image of Arethusa in the middle of a **svastika_** glyph. Arethusa, a nymph known in several different parts of Greece, usually the Pelopponnese and Sicily. She was one of the Nereids. The river-god Alpheus fell madly in love with her, but she fled to Sicily. There she was changed into a fountain (the Fonte Aretusa, in Syracuse) by Artemis. Apheus made his way beneath the sea, and united his waters with those of Arethusa.

Svastika, a traded commodity -- zinc

The svastika glyph connotes a countable object as seen from the number of glyphs shown on inscribed objects, On h165 seal, there are 4 svastika signs; this leads to the surmise that the svastika represents a countable *object.*

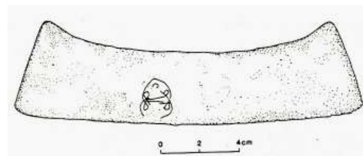




Copper finger ring, Sirkap, Taxila, Stratum I, (Pl. 197, No. 24, Marshall); a total of nine symbols are inlaid on the ring including svastika_, vajra, cakra, triratna, s'ri_vatsa, Pl. XXII.

Vajra and cakra are weapons. It is likely that svastika_ is also a weapon or tool: s'akti (flag)staff, spear (MBh.); **satti** = knife, dagger (Pali); satti = a kind of weapon (Pkt.); sa_t = sword, spear (CDIAL 12251). It can be demonstrated that the 's'ri_vatsa' glyph is a derivative from a composite glyph of two fishes.
Svastika_ connotes **satva, sattu** 'zinc, pewter'; endless-knot connotes **mer.ed** 'iron'. (Rebus: sattiya 'svastika glyph'; mer.hao 'twisted')
Endless-knot motif appears on the following objects:

1. Rojdi. Ax-head or knife of copper, 17.4 cm. long (After Possehl and Raval 1989: 162, fig. 77



2. Cylinder seal impression. Sumer (ca. 2500 BCE). After Amiet 1980a: pl. 108, no. 1435





3. Early Dynastic seal. Lagash.
Early Dynastic seal, depicting an endless knot motif facing the turned face (**krem-**) of a battling tiger (**kol-kamar**, smelter-smith); Lagash. [After Amiet, 1980, pl. 83: no. 1099]

The endless-knot glyph and the signs may be read as:

Alternatives:

Alternative: Substantive: *me~rhe~t* 'iron'; *me~rhe~t icena* 'the iron is rusty'; *ispat me~rhe~t* 'steel', *dul me~rhe~t* 'cast iron'; *me~rhe~t khan.d.a* 'iron implements' (Santali) *med.* (Ho.)(Santali.lex.Bodding) mer.ed, mr.ed, mrd iron; enga mer.ed soft iron; sand.i mer.ed hard iron; ispa_t mer.ed steel; dul mer.ed cast iron; i mer.ed rusty iron, also the iron of which weights are cast; bicamer.ed iron extracted from stone ore; balimer.ed iron extracted from sand ore (Mu.lex.)

The entwined stones around a pillar or an entwined snake glyph:

mer.hao = v.a.m. entwine itself; wind round, wrap round roll up; mar.hna_ cover, encase (H) (Santali.lex.Bodding) [Note: the endless-knot motif may be a rebus representation of this semant. 'entwine itself']. **med.ha_** = curl, snarl, twist or tangle in cord or thread (M.); **meli, melika** = a turn, a twist, a loop, entanglement; **meliyu**, melivad.u, meligonu = to get twisted or entwined (Te.lex.) **merhao** = twist (Mun.d.ari)

med.i = sound, roar (TS 5.7.8.1); methis.t.ha = worthy of hearing (TBr. 2.7.6)(Vedic.lex.) **mleccha** = a man speaking any language but Sam.skr.ta and not conforming to brahmanical institutions; a kira_ta, s'abara or pulinda etc.; mleccharene kod.ava kod.agaru…kod.ava kon:garu (Ka.lex.) mlaskati = to snap with tongue (Slovan)(Vedic.lex.) mle_ch = speak indistinctly (Skt.); mle_cchati speaks indistinctly (S'Br.) brichun, pp. bryuchu = to weep and lament, cry as a child for something wanted or as motherless child (K.)(CDIAL 10384). milakkha, milakkhu non-aryan (Pali); malak savage; malaki-du_ a Vadda_ woman (Si.); mila_ca wild man of the woods, non-aryan (Pali); maladu wild, savage (Si.); mi_cuth, mi_catas habit or life of an outcaste (K.)(CDIAL 10390). mle_ccha = non-aryan (S'Br.); maleccha, miliccha, meccha, miccha = barbarian (Pkt.); mi~_ch, mi~_cas non-hindu (K.); milech, malech Moslem, unclean outcaste, wretch (P.); mele_ch dirty (WPah.); mech a Tibeto-Burman tribe (B.); milidu, milindu wild, savage (Si.)(CDIAL 10389).

Alternative : d.on.t.ho 'knot'; rebus: d.hon.d. 'stone-cutter'

Glyph: *d.on.t.ho, dhon.t.ho, dhon.t.o* a knot (Santali)

d.hon.d.-phod.o [M. dhon.d.a_, a stone] a stone-cutter, a stone-mason; *d.hon:d.-jhod..o* [M. *dhon.d.a_* a stone + *jhod.avum*] a stone-cutter; a stone-mason; *d.hon.d.o* a stone; a blockhead; a stupid person (G.)

kacc iron, iron blade (Go.)(DEDR 1096). kars.i furrowing (Skt.); ka_rs.i ploughing (VS.); kars.u_ furrow, trench (S'Br.); ks.i_ plough iron (Pr.); kas.i mattock, hoe (Pas'.); kas.i spade, pickaxe (Shum.); khas.i_ small hoe (Dm.)(CDIAL 2909). kr.s.ika, kus'ika, kus'i, kus'ira a ploughshare (Skt.Ka.)(Ka.lex.) kes.a plough (Pas'.)(CDIAL 3444). kis' plough (Kho.)(CDIAL 3455). ks.e plough iron (Pr.)(CDIAL 2809). Mattock, hoe: kas.i mattock, hoe (Pas'.); Spade, pickaxe: kas.i spade, pickaxe (Shum.); kars.i furrowing (Skt.); kars.u~ furrow, trench (S'Br.)(CDIAL 2909)

keccu the knot which is formed by twisting; to join the end of two threads by twisting them with the fingers (Ka.); kerci a knot (Tu.)(DEDR 1965).

granthi = knot (RV. 9.97.18); ga_n.t.ha (H.); granthin = twined together (RV 10.95.6); granth = to tie together (Vedic lex.)

L051a Seal. **granthi** = honey-comb (Pa_n. 4.3.116, Va_rtt.); cf. Nir. 1.20; granthi = knot of a cord, knot tied in the end of a garment for keeping money (Pan~cat.); a knot tied closely and therefore difficult to be undone, difficulty, doubt (Ch.Up.); granthila = knotted, knotty; grath = to be crooked (Dha_tup. 2.35); granthi = crookedness (Skt.lex.)

gan.t.lu (pl.), gan.t.i = hole bored in ears for ear-rings (Te.lex.)

brahma granthi = a sort of knot holding together the ends of dwija's sacred thread; gan.t.u = a knot (Te.lex.) grathana_ = tying, binding, ensnaring; grathita = strung, tied (RV 9.97.18; S'Br. 11) (Skt.lex.)

kranta = the meeting place of cross-roads; a lane; a hole (Te.lex.)

A remarkable demonstration of

(1) the continuity of the motif of endless knot in the Indian civilization from ca. 3rd millennium BC upto the 17th cent. AD.and even today, in South India; and
(2) the parallel use of the motif of the endless knot in Mesopotamian civilization ca. 3rd millennium BC.

grantha = a book or composition in prose or verse; a code; grantha lipi = one of the various characters used in writ (Ka.lex.)

kr.ta = injured, killed; kr.ti = hurt, hurting, injuring; a kind of weapon, sort of knife or dagger (RV 1.163.3) (Skt.lex.)

krandukayyamu = tumultuous mob fight (Te.lex.)

krandadi.s.t.i = having roaring speed or moving with a great noise, said of Va_yu (RV 10.100.2); kranda = a cry, neighing (AV 11.2.22); a cry, calling out (AV 11.2.2 and 4.2) krandanu = roaring (RV 7.42.1); krandya = neighing (TBr. 2.7.7.1, parjanya krandya); krandana = crier; crying out; mutual daring or defiance, challenging (Skt.lex.). khar. = a call to cattle (Santali.lex.) khat. khat. = with a swish, thud, as of a horse's hoofs (Santali.lex.) kharajru = quick in motion (RV 10.106.7)(Vedic.lex.) kranditamu, krandanamu = cry, lamentation; krandillu = to sound, to resound (Te.lex.)

kratha = name of a race always named with the Kais'ikas and belonging to the ya_dava people; name of an Asura (MB h. 2.585; Skt.lex.)

kranta = the betrothal presents taken to the bride from the bridegroom's house (Te.lex.) **grantha** = giving, da_na; bha_gi, vibha_ga (Ka.lex.)

grantha = wealth, property (Ka.lex.)

Inscribed objects containing the 'endless knot'

Glyph: The endless knot = **kra_nta, ga_n.t.ha** (Hindi) [cf, Lagash. Early Dynastic Seal with a variant of the endless knot. After Amiet 1980a: pl. 83, no. 1099.]

Substantive: **kra_nta** = invading, attacking (Skt.lex.) In the Tantra tradition, Bha_ratavars.a is divided into three parts called kra_nta-s: vis.n.u-kra_nta, ratha-kra_nta, as'va-kra_nta each part having 64 tantra-s attached.

Land east of the Vindhya ranges, extending upto Ja_va is Vis.n.u-kra_nta; the region north of Vindhya including maha_ci_na is as'va-kra_nta and the rest of the nation is as'va-kra_nta.

krandas = battle-cry, army (RV 10.121.6) yam krandasi_ avasa_ tastab ha_ne 'dya_va_pr.thivyau' (Vedic.lex.) krath = to hurt, kill (Dha_tup. 19,39; caus. kra_thayati, to hurt, injure, destroy (with gen. of the person hurt, Pa_n. ii, 3.56, Dha_tup. 34.19); krathana = cutting through (as with an ax); slaughter, killing (Skt.lex.) krathana = killing, slaughter (Ka.lex.) gan.t.u = to cut, to wound; a wound, hurt; gan.t.i = a wound (Te.lex.)

krandas = n. battle-cry; du. two contending armies shouting defiance [heaven and earth: Sa_yan.a]

yam krandasi_ sr.latayati_ vihvyete pare vara ubhaya_ amitra_h
sama_nam cid ratham a_tasthivalatasa_ na_na_ havete sa jana_sa indrah
RV 2.012.08 Whom (two hosts), calling and mutually encountering, call upon; whom both adversaries, high and low, (appeal to); whom two (charioteers), standing in the same car, severally invoke; he, men, is Indra. [Whom (two hosts): yam krandasi_ sanyati_ vihvayete = whom, crying aloud, encountering (two), invoke; the substantive is supplied: rodasi_, heaven and earth; or, dve sene, two armies; whom (two charioteers): here also a substantive is supplied: rathinau, two charioteers; or Agni and Indra].

s'u_ro va_ s'u_ram vanate s'ari_res tanu_ruca_ tarus.i yat kr.n.vaite
toke va_ gos.u tanaye yad apsu vi krandasi_ urvara_su bravaite

RV 6.025.04 The hero, (favoured by you), assuredly slays the (hostile) hero by his bodily prowess, when, both excelling in personal strength, they strive together in conflict, or when, clamorous, they dispute for (the sake of) sons, of grandson, of cattle, of water, of land.

yam krandasi_ avasa_ tastabha_ne abhy aiks.eta_m manasa_ rejama_ne

yatra_dhi su_ra udito vibha_ti kasmai deva_ya havis.a_ vidhema

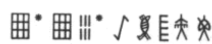
RV 10.121.06 Whom heaven and earth established by his protection, and shining brightly, regarded with their mind, in whom the risen sun shines forth -- let us offer worship with an oblation to the divine Ka.

The importance of the glyph denoting **svastika** may be seen from the composition in m0488 tablet in bas relief. It occupies the center of the field and is flanked by an elephant and a tiger looking back:

m0488Atm0488Btm0488Ct



2802 Prism: Tablet in bas-relief. Side b: Text +One-horned bull + standard. Side a: From R.: a composite animal; a person seated on a tree with a tiger below looking up at the person; a svastika within a square border; an elephant (Composite animal has the body of a ram, horns of a zebu, trunk of an elephant, hindlegs of a tiger and an upraised serpent-like tail). Side c: From R.: a horned person standing between two branches of a pipal tree; a ram; a horned person kneeling in adoration; a low pedestal with some offerings.



On side B of a tablet (h177), kneeling person is shown in prayer in front of a standing person under an arch decorated with a toran.a of ficus leaves.

man.d.a = a branch; a twig (Te.lex.)

man.d.i = kneeling position (Te.lex.) mandil, mandir = temple (Santali) ma_d.a = shrine of a demon (Tu.); ma_d.ia = house (Pkt.); ma_l.a a sort of pavilion (Pali); ma_l.ikai = temple (Ta.)(DEDR 4796).

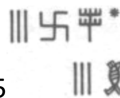
man.d.iga = an earthen dish (Te.lex.) **man.d.e** = a large earthen vessel (Tu.lex.) **man.di** earthen pan, a covering dish (Kond.a); cooking pot (Pe.); brass bowl (Kui); basin, plate (Kuwi)(DEDR 4678). man.d.e = head (Kod.)(DEDR 4682).

man.d.a_ = warehouse, workshop (Kon.lex.)

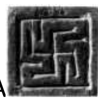
Glyph: *sal* a gregarious forest tree, *shorea robusta*; *kambra* a kind of tree (Santali)
Substantive: *sal* workshop (Santali)

m0482At m0482Bt  1620

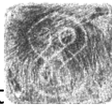
Pict-65: Gharial (or lizard), sometimes with a fish held in its jaw and/or surrounded by a school of fish.

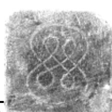
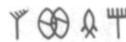
 h165 4500 On h182 tablet, there are 5 svastika signs; on h165 seal, there are 4 svastika signs; this leads to the surmise that the svastika represents a countable *object.* Ponea 'four' (Santali); rebus: pon 'gold' (Ta.); sathiya 'svastika glyph'; rebus: sattva, jasada 'zinc' (Ka.Skt.H.) mo~r.e 'five (count)' (Santali); rebus: man.d.ua 'booth, shed' (Santali)

On tablet m0482, the svastika follows the glyph of a tree branch '*aduru*'; hence the two signs may be read as: *aduru* 'metal' + *satthiya* 'knife, dagger' (*s'akti* –Skt.) swadhiti (RV.AV.) **sathiya_** (H.) knife, dagger; sathia_, satthaka = knife (Pkt.Ka.)

 m1225A  m1225B.  1311 Cube seal with perforation through the breadth of the seal Pict-118: svastika_ , generally within a square or rectangular border.

.  m1389t  Rahman-dheri150

 m0507At  m0507Bt  3350

 m0508At  m0508Bt  3352

http://kalyan97.googlepages.com/svastika1.doc
http://kalyan97.googlepages.com/svastika2.doc
http://kalyan97.googlepages.com/annex1asvastika.doc
http://kalyan97.googlepages.com/annex1bsvastika.doc
http://kalyan97.googlepages.com/Annex2aSvastikaseals.doc
http://kalyan97.googlepages.com/Annex2bSvastikaseals.doc

Rao finds the svastika motif more common in Mesopotamia than in the Sarasvati civilization. Paul Amiet suggests an Iranian origin for the svastika motif. [Paul Amiet, 1961, *La glyptique Mesopotamienne Archaique,* Paris]

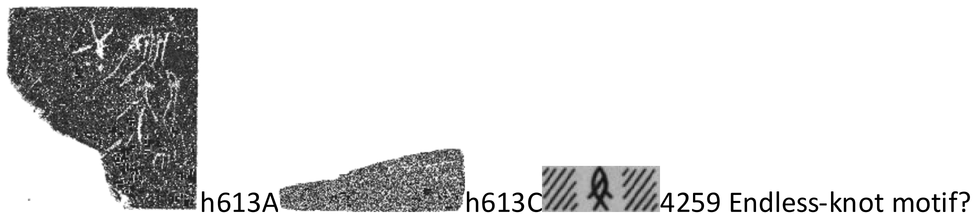




Yaudheya coin. Godess Sas.t.hi on reverse. S.an.mukha with lance on obverse. Lucknow State Museum. A remarkable legacy of the Sarasvati

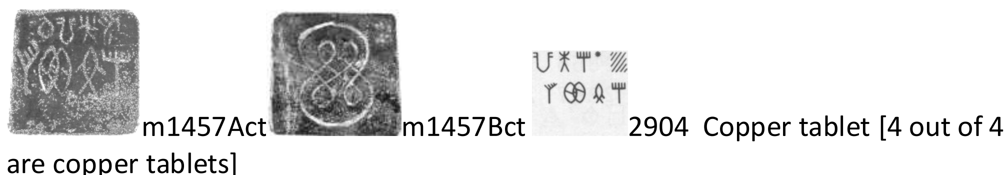
Sindhu inscriptions is echoed in the glyphs of a svastika_ above tree on railing (*Journal of the Numismatics Society of India*, Vol. V, Pt.I, June 1943) This is obviously a rebus pun on the word: satthi, s'akti, spear, sas.t.i = six, satthika = auspicious symbol. The tree may be also be a rebus representation.

Godess S'as.t.hi. Mathura, 2nd cent. Mottled red sandstone 67.8 X 34.5 cm (MIK I 5924). "The godess lifts her right hand in a gesture of salutation that is typical of the Kushana period. The hand is slightly turned inwards, towards the body (vya_vr.tta-mudra). Her left arm, which bends outward, rests on her hip. She wears a broad girdle, a thin band around the waist, and aa sash over the shoulders and arms. her jewellery comprises earrings, a braod necklace, and bangles... on the large nimbus, which occupies the entire upper half of the stele, five more female figures are seen, which seem to emanate from the main figure. Each of the secondary figures have both arms lifted, perhaps in an expression of joy. They hold certain objects in their hands which are difficult to identify... the large size of the present stele suggests that it was meant for a temple..." (Heino Kottkamp, Exhibit 26 in: Saryu Doshi, ed., 1998, *Treasures of Indian Art: Germany's tribute to India's cultural heritage*, Delhi, National Museum, p.33).


h613A h613C 4259 Endless-knot motif?


Chanhudaro49A Chanhudaro49B

Chanhudaro50A Chanhudaro50B


m1457Act m1457Bct 2904 Copper tablet [4 out of 4 are copper tablets]



m0457At m0457Bt m0457Et [Frequency 13]



m0458At m0458Bt 3227



m0459At m0459Bt 3225



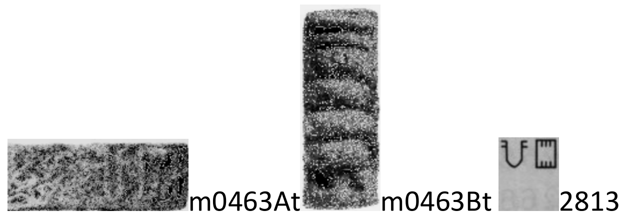
m0460At m0460Bt 3228



m0461At m0461Bt 2806 Pict-73: Alternative 1. Serpent (?) entwined around a pillar with capital (?); motif carved in high-relief.



m0462At m0462Bt 3215



m0463At m0463Bt 2813



Four-crosses motif on a Mohenjo-daro tablet M-463 is comparable to the same motif which appears painted on a potsherd of Malwa ware from Navdatoli, Maharashtra, c. 1700-1400 BCE. [After H.D.Sankalia, SB Deo and ZD Ansari, 1971, *Chalcolithic Navdatoli: the excavations at Navdatoli, 1957-59*. Poona: 216f., fig. 87: D 585 (sherd 8355 I A 13/5; After Paropla, 1994, p.55, fig. 4.4).

Alternatives:

ko_lam = form (Ta.Ma.) Rebus: **kol** 'metal'

kan.d.a kanka 'rim of pot'; rebus: **kan.d.** 'altar, furnace' + **kan-** 'copper'

pa~er.e~ = overflow channel of a tank (Santali).

Rebus: articles of joint family (**pa~er.e~**) (Santali).

Alternatively, the endless-knot motif which follows the pair of signs (following Text 2813, for example) may be read as:

me~e.he~t = iron (Santali)

The entwined stones around a pillar or an entwined snake glyph:

mer.hao = v.a.m. entwine itself; wind round, wrap round roll up; mar.hna_ cover, encase (H) (Santali.lex.Bodding) [Note: the endless-knot motif may be a rebus representation of this semant. 'entwine itself']. **med.ha_** = curl, snarl, twist or tangle in cord or thread (M.); **meli, melika** = a turn, a twist, a loop, entanglement; **meliyu**, melivad.u, meligonu = to get twisted or entwined (Te.lex.) **merhao** = twist (Mun.d.ari)

Rebus: **melukka** 'copper'
Alternative 1: (sharp weapon; sharpness connoted by the 'knot' glyph): Substantive: **patam** = sharpness (as of the edge of a knife)(Ta.); padm (obl. Padt-) temper of iron (Ko.); pada = keenness of edge or sharpness (Ka.); **hada** = sharpeness (as of a knife), forming (as metals) to proper degree of hardness (Tu.); **padna_** sharpness (Go.); padanu, padunu = sharpness, temper (Te.); **padnu** = sharpening (of knife by heating and hammering)(Kond.a); pato = sharp (as a blade); **patter** = to sharpen (Malt.)(DEDR 3907).
badha = bound; **bandha** = tied up, hindered; bandh = an iron band round the nave of a cart wheel to prevent it from splitting (Santali)
paddu = item, entry in an account (Te.); **poddu** – thing, item (Pa.)(DEDR 3919).
pantam = torch, lamp (Ta.); torch (Ma.); pantye small lamp (Tu.)(DEDR 3919). [Note the procession carrying the standard device, the one-horned bull and perhaps a torch in front.]
badhor, badhor.ia = crooked, cross grained, knotty (Santali.lex.)
badhoria 'expert in working in wood'(Santali)

Alternative 2: melh 'copper'; rebus: mer.hao 'entwined'; **mer.hao** = to entwine itself, wind round, wrap around, roll up (Santali.lex.) [Note the endless knot motif].

Glyph: *malukku* slip-knot (Ta.); *malaku* a turn, twist, fold (Ka.); *mala-gonu* to be twisted; *maluku* a turn, slip-knot (Te.)(DEDR 4734).

Melukka = copper (Pali)

Alternative 3: d.on.t.ho ‘knot’; rebus: d.hon.d. ‘stone-cutter’

Glyph: *d.on.t.ho, dhon.t.ho, dhon.t.o* a knot (Santali)

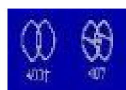
d.hon.d.-phod.o [M. dhon.d.a_, a stone] a stone-cutter, a stone-mason; *d.hon:d.-jhod..o* [M. *dhon.d.a_* a stone + *jhod.avum*] a stone-cutter; a stone-mason; *d.hon.d.o* a stone; a blockhead; a stupid person (G.)

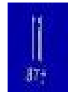
Considering that on the cylinder seal impression from Sumer the motif of ‘endless-knot’ is shown together with a chariot accompanied by persons carrying weapons and also a dog, the entire glyptic could be related to a hunting expedition. This is consistent with the other part of the cylinder seal on the top register depicting a boat journey, also accompanied by a person carrying a spear. Thus, the ‘endless-knot’ as a glyph should be related to semant. ‘attack’ or ‘killing’.

The association of the ‘endless-knot’ glyph with the ‘svastika’ glyph points to both the glyphs as related to the description of a weapon.


h182A h182B 4306Tablet in bas-relief
h182a Pict-107: Drummer and a tiger. h182b Five svastika signs alternating right- and left-handed. har609 terracotta tablet, bas-relief [The drummer is also shown on h182B tablet with a comparable epigraph and five svastika glyphs alternating right- and left-handed arms. [Lexeme : **mo~r.e~** = five (Santali. lex.)]

The text 4306:


Glyph: cur.i a bracelet, a bangle (Santali)
Glyph: millstone: san:ghat.i = a millstone, that crushes (Ka.)
Rebus: cu_l.ai, ‘kiln’ (Ta.) culli = a fireplace (Ka.)
Rebus: saghad.i_ = furnace (G.)

 (34)  (21)

Glyph: *d.hol* ‘a drum beaten on one end by a stick and on the other by the hand’ (Santali); *d.hol* ‘drum’ (Nahali); *dhol* (Kurku); *d.hol* (Hi.) *dhol* a drum (G.) Rebus: **dul** ‘to cast in a mould’; **dul me~r.he~t, dul mer.ed., dul**; **kot.e mer.ed.** ‘forged iron’ (Santali)

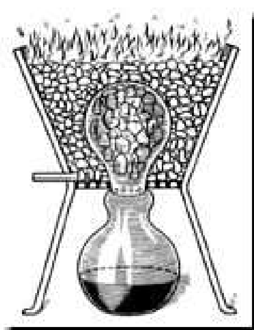
Vikalpa: *man.d.ao* ‘to occupy a new house, to take up one’s residence’; *man.d.hwa, man.d.ua, man.d.wa* ‘a temporary shed or booth erected on the occasion of a

marriage'; *man.d.om* 'a raised platform or scaffold'; *ma~r.om* 'a platform, used to keep straw on, or from which to watch crops' (Santali) *mandar* 'the headman of a village'; *man.d.wari* 'the Marwari caste of hindus' *Ko.* man Toda mund (i.e. village); burning place for dry funeral; mandm (*obl.* mandt-) meeting. *To.* mo (*obl.* mot-) locus of tribal activity, including village with dairy, dairy apart from village, and funeral place; patrilineal clan. *Ka.* mandu hamlet of the Todas on the Nilagiri. *Ko.* mandï village green; *Ta.* mau hall of assembly, golden hall of Chidambaram, court of justice, arbitration court, cow-stall, herd of cows, raised platform under a tree for village meetings, centre of a garden, junction of four roads or streets (DEDR 4777).

Glyph: mo~r.e 'five' (Munda etyma)

Sattva 'svastika glyph'; rebus: jasta, yasada, sattva 'zinc'
Mo~r.e 'five (count)'; rebus: man.d.ua 'booth, shed'

The hieroglyph showing five svastika: zinc-shed or zinc-granary.



Discovering the 8th metal A history of Zinc
Fathi Habashi

History of Zinc

Centuries before zinc was discovered in the metallic form, its ores were used for making brass and zinc compounds were used for healing wounds and sore eyes. Although the word brass frequently occurs in the Old Testament, there is little evidence that an alloy of zinc and copper was known in early times. The word translated "brass" might equally well be rendered bronze or copper, both of which were in common use.

Figure1: Schematic representation of the Indian method for producing zinc.

In the latter part of the thirteenth century, Marco Polo described the manufacture of zinc oxide in Persia and how the Persians prepared tutia (a solution of zinc vitriol) for healing sore eyes.

The Roman writer Strabo (66 B.C. - 24 A.D.) mentioned in his writings that only the Cyprian ore contained "the cadmian stones, copper vitriol, and tutty," that is to say, the constituents from which brass can be made. It is believed that the Romans first made brass in the time of Augustus (20 B.C. to 14 A.D.) by heating a mixture of powdered calamine, charcoal and granules of copper. Roman writers observed that coins made from orichalcum were undistinguished from gold.

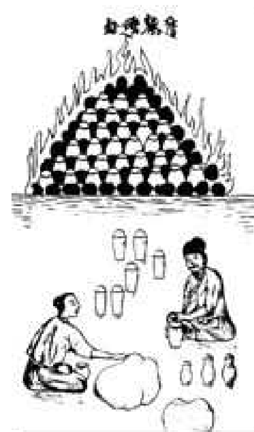
Zinc in India

The production of metallic zinc was described in the Hindu book Rasarnava which was written around 1200 A.D. The fourteenth century Hindu work Rasaratnassamuchchaya describes how the new "tin-like" metal was made by indirectly heating calamine with organic matter in a covered crucible fitted with a condenser. Zinc vapour was evolved and the vapour was air cooled in the condenser located below the refractory crucible (Figure 1). By 1374, the Hindus had recognized that zinc was a new metal, the eighth known to man at that time, and a limited amount of commercial zinc production was underway.

At Zawar, in Rajasthan, great heaps of small retorts bear testimony to extensive zinc production from the twelfth to the sixteenth centuries. The tubular retorts are about 25 cm long and 15 cm in diameter with walls about 1 cm thick. A small diameter tube was sealed onto the open end and the zinc vapours likely condensed in this. The retorts were closely spaced in a furnace which was probably heated with charcoal fanned by bellows. Both zinc metal and zinc oxide were produced. Zinc was used to make brass whereas the oxide was used medicinally. Over 130,000 tons of residue remain at Zawar and this represents the extraction of the equivalent of 1,000,000 tons of metallic zinc and zinc oxide.







Zinc in China

Figure 2: The Chinese learned about zinc production sometime around 1600 A.D.

From India, zinc manufacture moved to China where it developed as an industry to supply the needs of brass manufacture. The Chinese apparently learned about zinc production sometime around 1600 A.D. An encyclopedia issued in the latter half of the sixteenth century makes no mention of zinc, but the book Tien-kong-kai-ou published early in the 17th century related a procedure for zinc manufacture. Calamine ore, mixed with powdered charcoal, was placed in clay jars and heated to evolve zinc vapour. The crucibles are piled up in a pyramid with lump coal between them (Figure 2), and, after being brought to redness, are cooled and broken. The metal is found in the center in the form of a round regulus. Zinc production expanded and metal began to be exported.

Zinc in Europe

Figure 3: Albertus Magnus described the production of brass.

Albertus Magnus (Figure 3) (ca. 1248) described how either calamine or furnace tutty might be used to colour copper gold. He suggested that a more golden lustre might be obtained by sprinkling crushed glass on top of the mixture in the crucible to form a slag which would help prevent the escape of the zinc vapour; in other words, increase the zinc content of the brass.

Biringuccio (ca. 1540) has the next most complete description of brass making. He described how either calamine or furnace tutty could be mixed with broken up pieces of copper and sprinkled with a layer of powdered glass, then heated in a closed crucible for 24 hours.



Figure 4: Georgius Agricola (1490-1555) observed in 1546 that a metal called "zincum" was being produced in Silesia.

Agricola (Figure 4) in 1546 reported that a white metal was condensed and scraped off the walls of the furnace when Rammelsberg ore was smelted in the Harz Mountains to obtain lead and silver to which he gave the name "contrefey" because it was used to imitate gold. This often consisted to metallic zinc, although he did not

recognize it as such. He observed, furthermore, that a similar metal called "zincum" was being produced under similar circumstances in Silesia by the local people. Paracelsus (1493-1541) (Figure 5) was the first European to state clearly that "zincum" was a new metal and that it had properties distinct from other known metals.

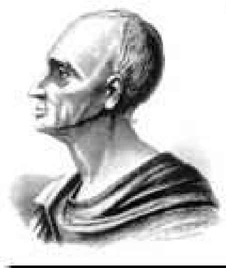
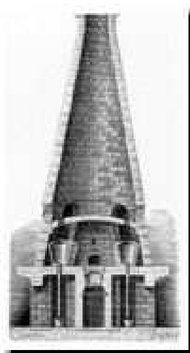


Figure 5: Paracelsus (1493-1541) was the first European to state clearly that "zincum" was a new metal.

Thus, by about 1600, European scientists were aware of the existence of zinc. All the metal they had examined, however, had likely been imported from the East by Portuguese, Dutch and Arab traders. However, there was a profusion of names quite unrelated to the local names for zinc ores. These included tutenag (derived from the Persian tutiya, calamine,which became the English tutty, zinc oxide) and spelter (likely from the similar coloured lead-tin alloy, pewter, or the Dutch equivalent, spiauter or Indian tin which the British scientist Robert Boyle latinised to speltrum in 1690 from which originates spelter, the commercial term for zinc. The word tutia, an old name for zinc oxide, is derived from a Persian word that means smoke and refers to the fact that zinc oxide is evolved as white smoke when zinc ores are roasted with charcoal.
In Renaissance times, latten (or laten, laton, lattyn) became the common English word for brass, akin to the French laiton (= brass) and Italian latta (= sheet brass), and probably based on the Latin latte or lathe (= sheet). The origins of the German word for brass, Messing, may be related to the Latin massa (= lump of metal). The modern English brass may be related to the French braser (= braze or solder). The word "zinc" may be derived from the Persian word sing meaning stone. In Arabic, zinc is known as kharseen, i.e. Khar from Al-Ghar = mine, seen from Al-Seen = China, hence kharseen, the metal from Chinese mines. The spelter trade with the East flourished throughout the seventeenth and first half of the eighteenth centuries, although there seem to be no records concerning the tonnages involved.

Figure 6: Andreas Marggraf (1709-1782) fully described the production of zinc from calamine.

In an extensive research "On the method of extracting zinc from its true mineral, calamine", Andreas Marggraf (Figure 6) in 1746 reduced calamine from Poland, England, Breslau and Hungary with carbon in closed retorts and obtained metallic zinc from all of them. He described his method in detail, thereby establishing the basic theory of zinc production. Marggraf also showed that the lead ores from



Rammelsberg contained zinc and that zinc can be prepared from sphalerite. Marggraf was probably unaware that in 1742, the Swedish chemist Anton von Swab (1703-1768) had distilled zinc from calamine and that, two years later, he had even prepared it from blende. Since the vapors rose to the top of the alembic before passing into the receiver, this process was called distillation per ascendum. In 1752 Swab and another Swedish chemist Axel Fredrik Cronstedt (1722-1765) developed at government expense the use of Swedish zinc ores for the manufacture of brass, to avoid the necessity of importing calamine.

The knowledge of deliberate zinc smelting in a retort was acquired by an Englishman on a visit to China just prior to 1740. A vertical retort procedure was developed by William Champion (1709-1789) and by 1743 a zinc smelter had been established at Bristol in the United Kingdom. A charge of calamine and carbon was sealed into a clay crucible having a hole in the bottom. This was luted onto an iron tube extending below the crucible furnace into a cool chamber below. The closed end of the iron tube sat in a tub of water and it was here that the metallic zinc was collected (Figure 7). The distillation took a total of about 70 hours to yield 400 kg of metal from all 6 crucibles positioned in the furnace. An annual production rate of 200 tons has been suggested for the works at that time.

Figure 7: William Champion's zinc smelting furnace.

This type of apparatus continued to be employed until 1851 although it was fuel inefficient, consuming 24 tons of coal for every ton of spelter produced. In 1758, William's brother, John, patented the calcination of zinc sulfide to oxide for use in the retort process, thereby laying the foundation for the commercial zinc practice which continued well into the twentieth century. The English zinc industry was concentrated in Bristol and Swansea.

The Welsh process was a batch operation which required withdrawing the crucible and retort after each cycle. It was labour intensive and fuel inefficient. A major technological improvement came with the development of the German process by Johann Ruberg (1751-1807) who built the first zinc smelting works in Wessola in Upper Silesia in 1798 which used the horizontal retort process developed by him. The principal advantage of this technique is that the retorts were fixed horizontally into the furnace allowing them to be charged and discharged without cooling. By placing the retorts in large banks, fuel efficiency was greatly increased. The raw material initially used was zinc galmei (calamine), a by-product of lead and silver production. Later, it became possible to produce zinc directly from smithsonite, an easily smelted ore. This was shortly followed by the use of zinc blende, which had first to be converted into the oxide by roasting. After this development, other smelting works were soon erected in Silesia near the deposits, in the areas around Liège in Belgium, in Aachen, in the Rhineland and Ruhr regions in Germany.

The first Belgian plant was built by Jean-Jacques Daniel Dony (1759-1819) in 1805 and also used horizontal retorts but of slightly different design. A larger plant was built in 1810. This was the predecessor of the Societé de la Vieille Montagne which a few years later became the largest zinc producing company in the world.

Zinc production in the United States started in 1850 using the Belgium process and soon became the largest in the world. In 1907, world production was 737,500 tons of which the USA contributed 31%, Germany 28%, Belgium 21%, United Kingdom 8%, and all other countries 12%.

The excellent resistance of zinc towards atmospheric corrosion soon led to its use in sheet production. The possibility of rolling zinc at 100-150¡C was discovered as early as 1805 and the first rolling mill was built in Belgium in 1812. More such mills were built in Silesia from 1821 onwards. Hot-dip galvanizing, the oldest anticorrosion process, was introduced in 1836 in France. This became possible on an industrial scale only after the development of effective processes for cleaning iron and steel surfaces. At first, only small workpieces were zinc coated. Continuous hot-dip galvanizing of semi-finished products and wire came later. In the United States, the

rich ore deposits led to rapid growth in zinc production in 1840, so that by 1907, Germany, which had for long been the world's leading producer of zinc, was left behind.
Zinc was produced for about 500 years from its oxide ores which are far less abundant than the sulfides, before the sulfides became the major source of supply. The technology of zinc production changed gradually during the centuries towards a more pyrometallurgical route. However, this tendency underwent a radical change during World War I when the roasting-leaching-electrowinning process was introduced and in the 1980's, when pressure leaching-electrowinning offered another practical route to zinc production.
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http://www.initiative-zink.de/309.htm

Thomas Wilson, [curator, Department of Prehistoric Anthropology], notes: "(svastika_) is characterized by straight bars of equal thickness throughout, and cross each other at right angles, making four arms of equal size, length and style." While not finding definitive clues as to its time or place of origin, Wilson concludes that the svastika_ was perhaps the first symbol to be made with 'a definite intention' and a continuous or consecutive meaning, the knowledge of which passed from person to person.



The view that the symbol may perhaps have represented a known object, is echoed by Ashley and Butts. H.J.D Ashley wrote: "In the first instance probably the svastika_ may have represented the course of the sun in the heavens revolving normally from left to right." (1925, The Swastika: A study, *The Quest*, January 1925). Edward Butts noted: "…It is evident that the svastika_ figure is only emblematic of what it originally was, from the fact that it must have been a more useful device and of very necessary application to have forced itself into the needs of so many widely distributed localities." [1901, *Statement No.1: The Swastika*, Kansas City, Franklin Hudson Publishing Co.]

Friedrich Max Mueller characterized the symbol with its hooks facing left-ward as suavastika, but there is no corroboration for such a lexeme. Wilson analyzed the occurrence of the symbol on artifacts – from funeral urns to spears – and attempted a classification by physical and symbolic properties to fathom some logic as to why the symbol has been prevalent in so many cultures for so long. It is difficult to surmise that the sign was just ornamental; it had some specific symbolic importance.

Troy. Svastika_ with four birds. [Compare the two ducks shown with the symbol in Cyprus. Source: Dr. Henry Schliemann, 1885, *Tiryns: the prehistorical palace of the kings of Tiryns*, New York, Charles Scribner's Sons]. "According to the migration theory (as opposed to the coincidence theory), the svastika_'s earliest known habitat is a wide territory beginning at the valley of the river Indus in India and extending

westward across Persia and Asia Minor to Hissarlik (where the remains of ancient Troy were found) on the shore of the Hellespont…W. Norman Brown contented (1933, The Swastika: The study of the Nazi claims of its Aryan Origin, Emerson Books) that 'for combined age, frequency, and perfect execution, the examples from the Indus Valley are the most interesting.'..Brown noted that the svastika_ was among India's 'first civilized remains, as early as 2500 BCE, possibly 3000 BCE, and appears in forms perfectly developed, in contrast with slightly older but primitive and less perfect forms found farther westward.' More important, Brown concluded that it existed in India before the arrival of the Aryans. 'Like other symbols which the Aryans of India used on coins and stone sculpture, it came to them from non-Aryan predecessors. It was a simple minutia of the spoils the victors had taken from those they had vanquished.'..The svastika_ was also discovered in the early 1930s in explorations of the ancient civilization in Baluchistan (in Central Asia)…The next chronological stratuth' (as Brown calls it) for the svastika_ appears at Hissarlik, the site of Homer's Troy, and many older cities that had risen and perished before it...According to Brown (and contrary to Schliemann's assertion), it was at Hissarlik or elsewhere in Asia Minor that the Indo-Europeans may for the first time have met the svastika_, but this is only a supposition." (Steven Heller, 2000, *The Swastika: symbol beyond redemption?* New York, Allworth Press, pp. 28-33).

W. Norman Brown who refuted the claim of Indo-European origins of the svastika_ was emphatic that the people who first used the symbol were the 'Japhetic' and the Indus Valley Peoples. "Whatever these various peoples were, they were not Indo-Europeans; and the Indo-Europeans, as far as our evidence indicates, did not know the svastika_ until a thousand years after the time of its earliest preserved specimens." He further adds: "Egypt seems to have been without it (svastika_) until very late, when Greece had arisen. Ancient Assyria and Palestine, as far as I know, were also without it… Although by 2000 BCE it extended across to the Hellespont, it passed to the north of the great Semitic territory and missed that people. The jews did not use it. Early Christianity seems not to have known it. The Christians used the svastika_ only after their religion was well established in Europe."



Many bronze articles with svastika_ sign; Dates: Unknown [Source: Thomas Wilson, *Report of National Museum*, 1894]. Celts who were proficient bronze- and gold-workers also used the svastika_ motif.

Bronze pin-head from the Caucasus





Marks of three svastika_ on black pottery from Caucasus

Fragment of bronze ceinture from Necropolis of Koban, Caucasus

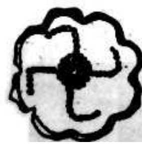
Bronze pin from Bavaria



Footprints of the Feet of the Buddha; note the svastika_ just below the fingers.



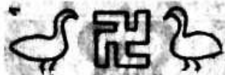
[Source: Alexander Cunningham, 1962, *The Stupa of Bharhut: a Buddhist monument*, Varanasi, Indological Book House]. Cypriot artifact with svastika_. Note the symbol on the stylized, flower-like wheel of the chariot.



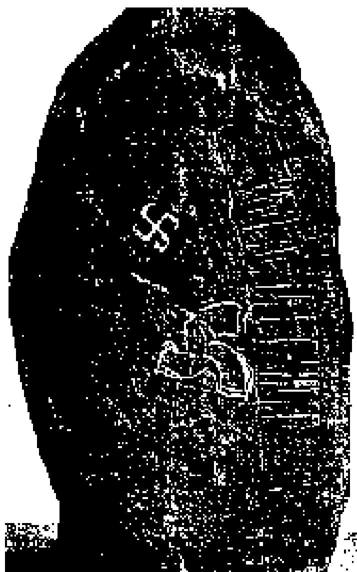
Ireland. Triskelion on carved wood.



Cypriot artifact with svastika_ flanked by two ducks.



Cypriot artifact with svastika_ on the shoulder of the warrior holding a bull model in his left hand; his hind-part is the hind-part of a bull?





The picture on the left shows a large runic stone bearing an inscription concerning the dead man it commemorates, three interlocked drinking horns, and a sinistroverse meandroid swastika. It was found at Snoldelev, Denmark. Iron spearhead showing runic inscriptions and two closed meandroid swastikas, one of them destroverse, and the other one sinistroverse.
Found at Brest-Litovsk, Russia, probably of Gothic origin, and dated from approximately the third, the fourth, or perhaps even the fifth century B. C.

Swastikas, mostly in its sinistroverse form, but also in its destroverse form, are currently found in weapons.





http://www.intelinet.org/swastika/swasti09.htm

Coin from Crete ca. 1000 BCE.

Samara (near Baghdad) 5000 BCE. (Fish and svastika glyphs)

Greek pottery 700 BCE. Two tigers (jackals?) and two peacocks facing each other. Svastika glyphs shown all around.

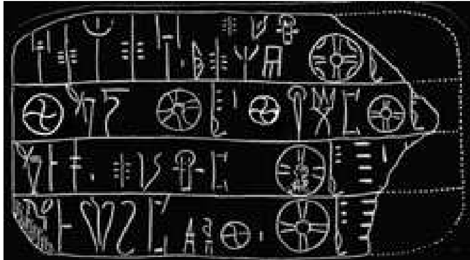




The lady with outstretched hands wears a skirt with fish glyph on it. (kolli 'fish'; kola 'woman'). Head of a bull (?) atop the tiger on the left.

http://www.heathenworld.com/swastika/

Shipwreck, Greek pottery, Ischia Museum / VIII century BC (Fish and svastika glyphs)



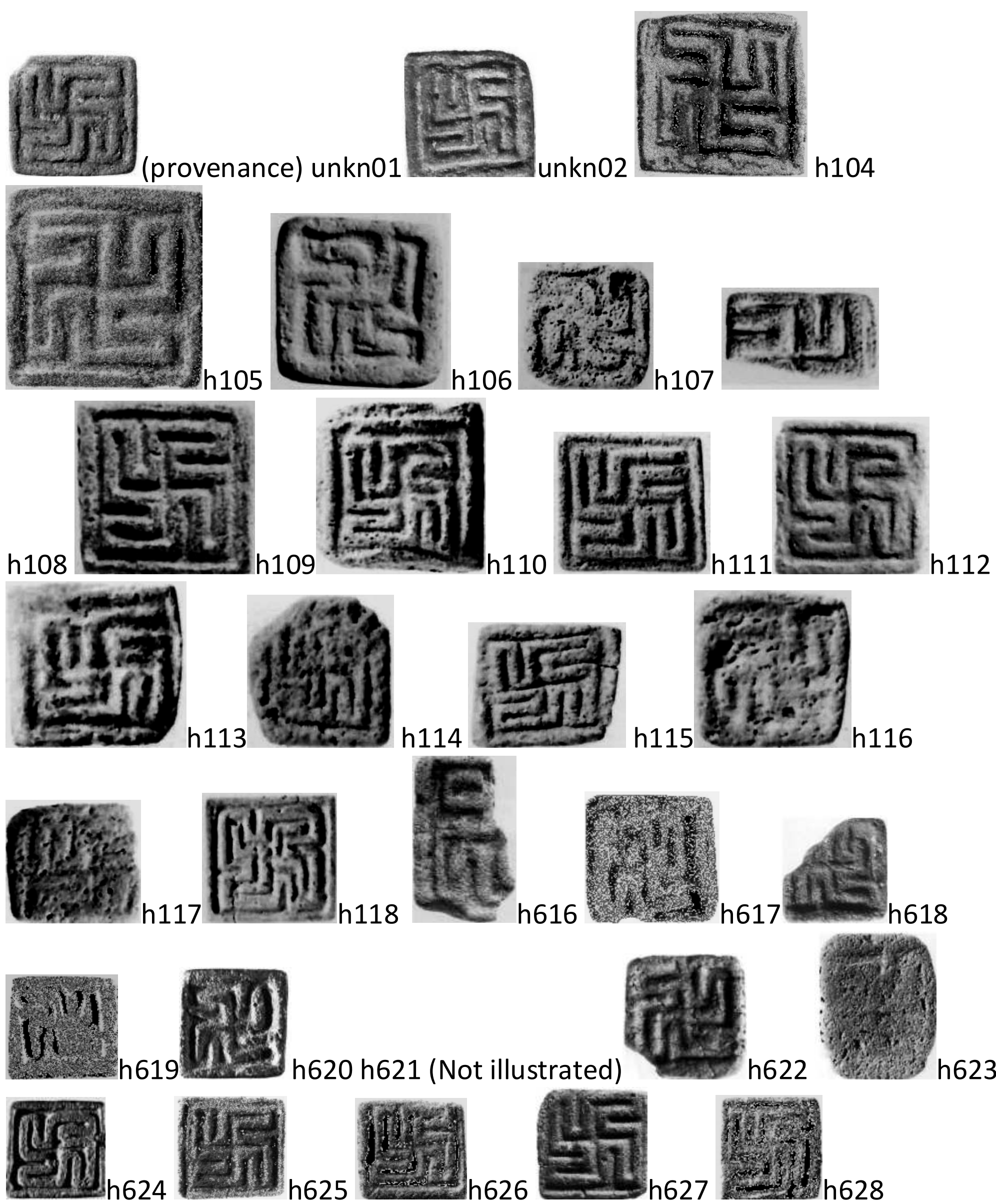
Minoan writing,
(Crete) / XIV century BC (Svastika within circles is shown on row 2 and row 4).

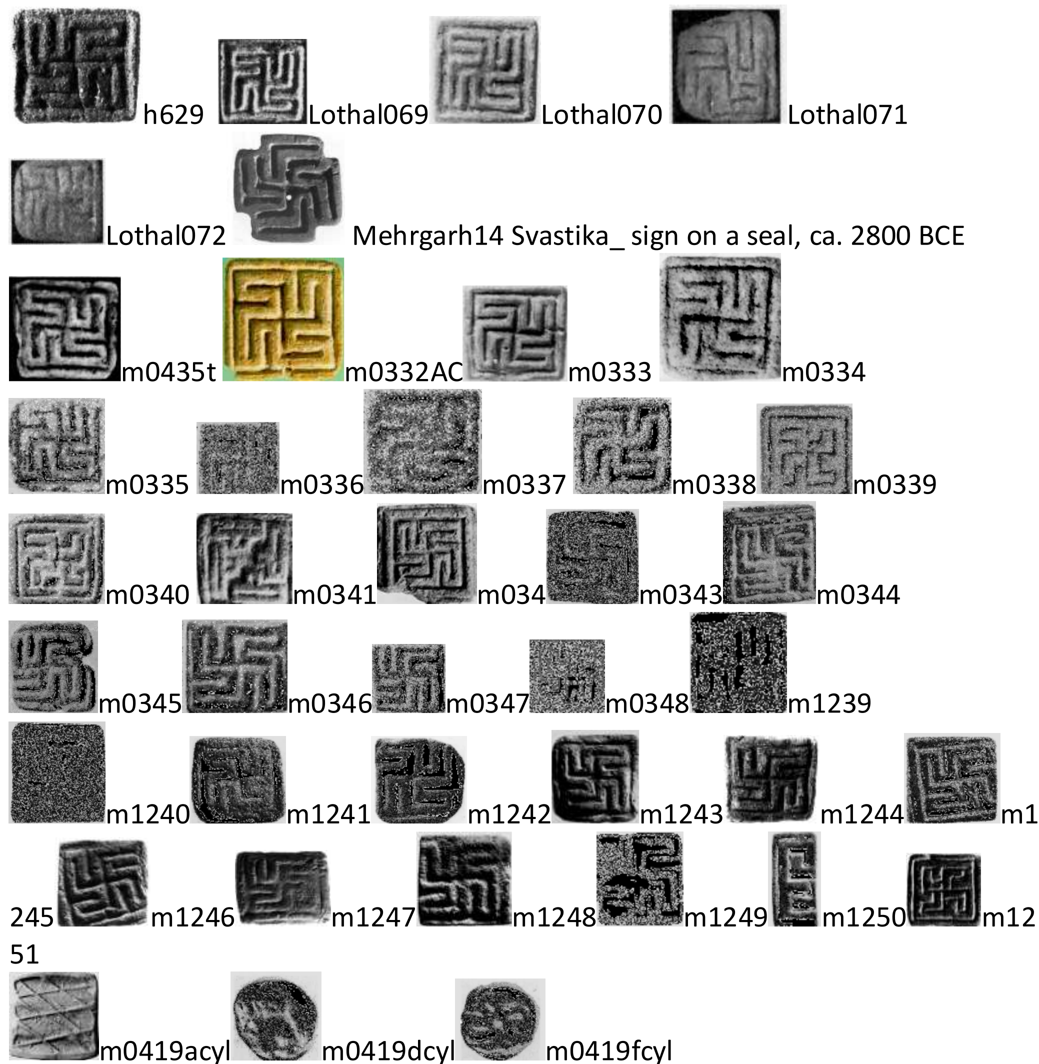


Altar, Pyrenees (South of France) /I Century BC (The altar shows a svastika and a fish – both are Sarasvati hieroglyphs.)
http://pagesperso-orange.fr/archeometrie/swastika.htm



EC515. India, Ujjain, Sunga Province, ca 150-75BCE, AE Square Karshapana. Floral device and stylized man/2 swastika symbols, cf. MACW4625-4627.http://www.ancient-art.com/images/ec515.jpg





h629 Lothal069 Lothal070 Lothal071

Lothal072 Mehrgarh14 Svastika_ sign on a seal, ca. 2800 BCE

m0435t m0332AC m0333 m0334

m0335 m0336 m0337 m0338 m0339

m0340 m0341 m034 m0343 m0344

m0345 m0346 m0347 m0348 m1239

m1240 m1241 m1242 m1243 m1244 m1

245 m1246 m1247 m1248 m1249 m1250 m12
51

m0419acyl m0419dcyl m0419fcyl



The hearth in house No. 45, Lepenski Vir Ib; between it and the stone 'table' is an altar carved in the semblance of a fish.

Photo: "Lepenski Vir" by Dragoslav Srejović 1972

The hearth with the receptacle surrounded by the stone 'tables' and the sculptures is separated from the living-area and becomes the centre of a little sanctuary. This sacral area is not crudely divided from the living-space by any definite construction, but its limits are clearly visible in the foundation and must have been sufficiently in evidence to order movement within the house. The thresholds at the entrance clearly direct all communication towards the sides of the house and suggest movement in a circle around the sacral area, though it is accessible from all sides. The stone 'tables' have this terminal quality; possibly they could only be

crossed in exceptional circumstances and only by certain privileged persons. Thus the sanctuary possessed its own area set apart from the living space.



Altar from house No. 45, Lepenski Vir Ib, carved in the likeness of a fish, possibly a carp.

Photo: "Lepenski Vir" by Dragoslav Srejović 1972

http://donsmaps.com/lepenski2.html Lepenski Vir Ib and later sites at Lepenski Vir
kOTo piDia>(P),,<kOTO piRia>(P) {N} ``^bell_^metal, ^brass''. |<piDia>, <piRia> `??'. cf.a_raku_t.a (Skt.) pittal.a (Te.) **pittala** n. brass , bell-metal; **pittala—** 2 n. '**brass**' lex. [*pītala*—2 n. '**brass**' lex. Pk. *pittala*— n. '**brass**'; P. *pittal* m. (→ S. *pitalu* m.), Ku. *pĩtal*, N. A. B. *pital*, Or. *pita⍰a*, Bi. Bhoj. *pītar*, H. *pītal* m., G. *pĩta⍰* n., M. *pita⍰* n. — Deriv.: P. *pitlī*, °*līā* 'brazen'; A. *pitalīyā* 'made of **brass**'; — Ku. *pitlai⍰o* 'tasting of **brass**, rather bitter'; H. *pitrāī* f. 'verdigris'. Addenda: **pittala—2:** S.kcch. *pittar* m. '**brass**', WPah.k⍰g. *pit⍰⍰* m., J. *pit⍰* m. (CDIAL 8184). **paittala—** 'made of brass' lex. [PITTALa—2] L.awā⍰. *pētlā* 'made of bronze' (CDIAL 8388). ***Ta.*** **pittalā⍰⍰am** deception, fraud. ***Ma.*** **pittalā⍰⍰am** lying, tricks. ***Ko.*** **pitl⍰m** failure to keep promise. ***Ka.*** **pittalā⍰a** trickery, lying, deceit, defrauding; ***Te.*** **pitalā⍰akamu** id. (DEDR 4166).

kastīra— n. 'tin' lex. 2. ***kastilla—.** 1. H. *kathīr* m. 'tin, **pewter**'; G. *kathīr* n. '**pewter**'. 2. H. (Bhoj.?) *kathīl*, °*lā* m. 'tin, **pewter**'; M. *kathīl* n. 'tin', *kathl⍰* n. 'large tin vessel' (CDIAL 2984).

<khOTO>(K),,<kOTO>(K) {N} ``^bedstead''. *O.<khOTO>(D), ?Engl.<cot>. %19171. #19031

O.<kO~kOra>, ~<kOrkOTO>, H.<kekARa>, Sk.<kArkATA>; cf. Ju.<tutukaD>.
<kaLaD>(M),,<kaRaD>(P),,<kaRar>(K) {N} ``^crab''. *Kh.<khaGkRa>(B), ~<khaGhaRa>(A), Sa.<kaTkom>, MuN<kaTkOm>, MuH<kaRkOm>, Ho<kaTkom>, ~<kaTO'b>, %15921. #15811.

trápu— n. 'tin' AV. Pa. *tipu*— n. 'tin'; Pk. *taü*—, *taüa*— n. 'lead'; P. *tũ* m. 'tin'; Or. *⍰aü* '**zinc**, pewter'; OG. *tarūaüṁ* n. 'lead', G. *tarvũ* n. — Si. *tum̆ba* 'lead' GS74, but rather X *tam̆ba* (CDIAL 5992)

So<tArpu>(L) {N} ``^lead, ^zinc''.
<tArpu>(L) {N} ``^lead, ^zinc''. #63821.

Dravya the ingredients or materials of anything MBh. R. object of possession , wealth , goods , money Mn. Ya_jn5. MBh. &c. ; gold R. vii , 18 , 34 Sch. ; bellmetal , brass

haMsalohaka n. brass **vartaka** f. a quail; n. a sort of brass or steel;

vartaloha n. a sort of brass or steel
zulbajan. brass (cf. **zulva** ‘copper’)
zulbArim. `" enemy of copper "' , sulphur;
zulla n. = %{zulba}‘copper’

saurASTra n. a kind of amalgam of zinc or copper , bell-metal , brass; simhala tin, brass; simhamala a kind of brass
bhUriloha n. a kind of brass or bell-metal
brAhmIbrAhmaNI a kind of brass (Ni_lak.)
brahmarIti f. a kind of brass **raitya** mfn. made of brass , brazen Mn. v , 114.
rIti yellow or pale brass , bell-metal Ra_jat. Katha_s. ; rust of iron; scoria or oxide formed on metals by exposure to heat and air
rItika n. calx of brass; f. brass , bellmetal **rīti—** 2 f. ‘yellow **brass**, bell metal’ Kathās., *rītika—* n. ‘calx of **brass**’, *°kā—* f. ‘**brass**’ lex. 2. **rīrī—,** *rirī—* f. ‘yellow **brass**’ lex. [Ac. to AO xviii 248 Dard. forms < *raktikā—2] 1. Dm. *rit* ‘copper’, Gaw. *rīt* (→ Sv. *rīda* NoPhal 49); Bshk. *rīd* ‘**brass**’, Tor. *žit* f. 2. Pk. *rīrī—* f. ‘**brass**’; Sh. *rīl* m. ‘**brass**, bronze, copper’ (CDIAL 10752).

aSTadhAtu m. pl. the eight metals collectively (as gold , silver , copper , tin , lead , brass , iron , and steel).
paJcaloha n. a metallic alloy containing 5 metals (viz. copper. brass , tin , lead , and iron)
triloha n. the 3 metals (copper , brass , and bellmetal) Hcat. i , 11; **lōhitaka—** ‘reddish’ Āpast., n. ‘calx of **brass**, bell- metal’ lex. [lôhita—] K. *lŏy* f. ‘white copper, bell—metal’ (CDIAL 11166) **lauhabhā a—** n. ‘iron pot, iron mortar’ lex. [laúha—, bhā a—1] Pa. *lōhabha a—* n. ‘copper or **brass** ware’; S. *luhã i ī* f. ‘iron pot’, L.awā . *luhã ā*; P. *luhã ā*, *loh ā*, ludh. *lõmacr;h ā* m. ‘frying pan’; N. *luhũ e* ‘iron cooking pot’; A. *lohorā* ‘iron pan’; Bi. *lohã ā* ‘iron vessel for drawing water for irrigation’; H. *loha ā*, *luh°* m. ‘iron pot’; G. *lo hũ* n. ‘iron, razor’, pl. ‘car- penter's tools’, *lo hī* f. ‘iron pan’(CDIAL 11173) **vartalōha—** n. ‘a kind of **brass** (i.e. *cup metal?)’ lex. [*varta—2 associated with lōhá— by pop. etym.?] Pa. *va alōha—* n. ‘a partic. kind of metal’; L.awā . *val ōā* ‘metal pitcher’, P. *val oh*, *ba°* f., *va lohā*, *ba°* m.; N. *ba lohi* ‘round metal vessel’; A. *ba lahi* ‘water vessel’; B. *bā lahi*, *bā ulāi* ‘round **brass** cooking vessel’; Bi. *ba lohī* ‘small metal vessel’; H. *ba lohī*, *°loī* f. ‘**brass** drinking and cooking vessel’, G. *va loi* f. Addenda: **vartalōha—:** WPah.k g. *b l ó * m. ‘large **brass** vessel’ (CDIAL 11357).

a_rakUTa m. n. a kind of brass.

a_ra n. brass BhP. x , 41 , 20 ; iron (Skt.)

Go. (SR.) **āre** potter's **wheel; *Ta.* ār ..i** circle, ring, **wheel**, discus weapon. (DEDR 398). **ara** m. the spoke or radius of a wheel RV.; the spoke of an altar formed like a wheel , S’ulb. n. the spoke of a wheel (Skt.) **ará— m. ‘spoke of a wheel’ RV. 2. āra— 2 MBh. v.l. [√r] 1. Pa. *ara*— m., Pk. *ara*—, *°ga*—, *°ya*— m.; S. *aro* m. ‘spoke, cog’; P. *ar*m. ‘one of the crosspieces in a cart- wheel’; Or. *ara* ‘felloe of a wheel’; Si. *ara***

'spoke'. 2. Or. *āra* 'spoke'; Bi. *ārā* 'first pair of spokes in a cartwheel'; H. *ārā* m. 'spoke', G. *ār*□ m. (CDIAL 594). **a_ra** n. a spoke MBh. i , 1498 (ed. Bomb. i , 33 , 4 reads %{ara}). a_ra_-mukha (Skt.) **araghat.t.a** m. a wheel or machine for raising water from a well (Hind.) Pancat. **araka** m. the spoke of a wheel Sus'r. **araghat□□a— m. 'wheel for raising water' Pañcat., °*aka*- m. lex. [ará—, *gha□□a—2] Pa. *aragha□□a*— m., Pk. *araha□□a—, rah°* m.; K. *araha□h*, dat. °□*as* m. 'Persian wheel'; S. *ar□u* m. 'Persian wheel, spinning wheel'; L. *aru□□*, *ara*□ m. 'Persian wheel', mult. *ra*□□ m. 'wheel of a well on which rope ladder and pots are hung'; P. *cuharh□ā* m. 'a well with four Persian wheels'; Ku. *raha*□ 'spindle'; N. *roho□e pi*□ 'a wheel on which seats are slung and used at fairs'; Or. *ara□a* 'spinning wheel', Bi. *rah□ā*; Mth. *raha*□, *rā°* 'wheel at the top of a well'; Aw. lakh. *rãha□ā* 'spindle'; H. *arha*□, *raha*□, *rẽ*□ m. 'Persian wheel', °□*ī* f. 'small do.', *rah□ā* m. 'Persian wheel, spinning wheel'; OG. *araha□a* m., G. *rahẽ*□, *r* e_ □, m. 'waterwheel', *r* e_ □*iy*□, °□*u*□□ m. 'spinning wheel'; M. *rahā*□, *rā*□ 'Persian wheel'. — Poss. X halá—: S. *hala□ru* m. 'Persian wheel with bullocks and apparatus included', P. *halha*□ m. 'Persian wheel'. Addenda: aragha□□a—: S.kcch. *ara*□ m. 'spinning wheel'. (CDIAL 596)**

ara_la crooked , curved Uttarar.

arara m. an awl (Skt.)

a_ra an angle ; a corner ; m. cavity Su_ryas.; f. a shoemaker's awl or knife ; a bore ; a probe RV. Sus'r. &c.; an aquatic bird.

Bi. *tamhe□ā* '**brass**—founder' (CDIAL 5783).

Bshk. □*ōl* '**brass** pot'; K. □*ol* m. 'bucket', S. □□*olu* m., P. □*ol* m., WPah.bhal. □*ol* n., Ku. N. B. Mth. □*ol*, Aw. lakh. □*ōlu* , H. *dol*, □*ol* m., G. □*ol* f., M. □*ol* m. Addenda: **dōla—2:** Bshk. □*ōl* '**brass** pot' (CDIAL 6583).

kaMsa a metal , tutanag or white copper , brass , bell-metal
kaMsakAra m. a worker in white copper or brass , bell-founder (considered as one of the mixed castes) BrahmaP.
kAMsya (fr. %{kaMsa}) consisting of white-copper or bell-metal or brass Ka_tyS'r. MBh. xiii , 94 , 91 R. Mn. iv , 65 ; (%{am}) n. whitecopper or bell-metal or brass , queen's metal , any amalgam of zinc and copper Mn. v , 114 ; xi , 167 ; xii , 62 Ya_jn. i , 190 Sus3r. ; a drinking vessel of brass , goblet S'a_nkhS'r. MBh. R. ; Hcat. (cf. AV. xviii , 3 , 17) ; a kind of musical instrument (a sort of gong or plate of bell-metal struck with a stick or rod) ; a particular measure of capacity. **kāṁsyakāra—** m. 'worker in bell—metal or **brass**' Yājñ. com., *kaṁsakāra*— m. BrahmavP. [kā̆ṁsya—, kāra—1] N. *kasār* 'maker of **brass** pots'; A. *kãhār* 'worker in bell—metal'; B. *kãsāri* 'pewterer, brazier, coppersmith', Or. *kãsārī*; H. *kasārī* m. 'maker of **brass** pots'; G. *kãsār*□, *kas°* m. 'coppersmith'; M. *kãsār*, *kās°* m. 'worker in white metal', *kāsār□ā* m. 'contemptuous term for the same'(CDIAL 2989) *kasērā* 'metal worker', P. *kaserā* m. 'worker in pewter'; N. *kasero* 'maker of **brass** pots'; Bi. H. *kaserā* m. 'worker in pewter'.(CDIAL 2988) **kāṁsya—** 'made of bell—metal' KātyŚr., n. 'bell—metal' Yājñ.,

'cup of bell—metal' MBh., °*aka*— n. 'bell—metal'. 2. ***kāṁsiya—.** [kaṁsá—1] 1. Pa. *kaṁsa*— m. (?) 'bronze', Pk. *kaṁsa*—, *kāsa*— n. 'bell—metal, drinking vessel, cymbal'; L. (Jukes) *kãjā* adj. 'of metal', awāṇ. *kāsā* 'jar' (← E with —*s*—, not *ñj*); N. *kãso* 'bronze, **pewter**, white metal', *kas—kuṭ* 'metal alloy'; A. *kãh* 'bell—metal', B. *kãsā*, Or. *kãsā*, Bi. *kãsā*; Bhoj. *kãs* 'bell—metal', *kãsā* 'base metal'; H. *kās*, *kãsā* m. 'bell—metal', G. *kãsũ* n., M. *kãsẽ* n.; Ko. *kãśẽ* n. 'bronze'; Si. *kasa* 'bell—metal'. 2. L. *kãihã* m. 'bell—metal', P. *kãssī*, *kãsī* f., H. *kãsī* f. (CDIAL 2987).

jasada n. zinc **yazada** n. zinc Bhpr.

ra_jni_ deep-coloured or yellowish-red brass (consisting of three parts of copper to one of zinc or tin) **raṅga—** 3 n. 'tin' lex. [Cf. nāga—2, vaṅga—1] Pk. *raṁga*— n. 'tin'; P. *rãg* f., *rãgā* m. '**pewter**, tin' (← H.); Ku. *rāṅ* 'tin, solder', gng. *rãk*; N. *rāṅ*, *rāṅo* 'tin, solder', A. B. *rāṅ*; Or. *rāṅga* 'tin', *rāṅgā* 'solder, spelter', Bi. Mth. *rãgā*, OAw. *rāṁga*; H. *rãg* f., *rãgā* m. 'tin, **pewter**'; Si. *raṅga* 'tin' (CDIAL 10562).
sAsthitAmrArdha n. a kind of amalgam of zinc and copper , bell-metal (= %{kAMsya})

sattvaguNa m. the quality of purity or goodness
Sattva true essence, material or elementary substance , entity , matter , a thing Nir. Pra_t.

svastika as a glyph; orthographic intimations in semantics of words:

satthika = belonging to a caravan (Pali); satthia (Pkt.); sothi = comrade (K.); sa_thi = comrade (S.); sa_thi_ = partner, opponent (L.); sa_tthu~, sa_thi_ = comrade (P.); sa_thi (N.B.Or.Aw.H.Marw.G.M.)(CDIAL 13366). Sa_thi = companionship, friendship (Or.)(CDIAL 13367). sattha = caravan (Pali.Pkt.); sa_t.ha = village (Pas'.); sa_t. (Par.); sa_th = company (K.); sa_thu = caravan (S.); sa_th small caravan (L.); company (P.); sa_thu_ = company, train (Oaw.); sa_th, poet. Sa_tha_ (H.); sa_tha = a group of people (H.); sa_th, sa_thva_ro = company of travelers (G.); sa_th = company, companionship (M.); sa_thi = companionship, friendship (Or.); sa_th, sa_t = with (Tor.); sa_ti (Sh.); sa_th (P.); sa~_th (Ku.); sa_tha (N.); sa_the, sa_th (B.); sa_tha (Or.); sa_th (Mth.Bhoj.Aw.H.); sa_thi_ (Marw.); sa_thim (OG.); sa_thi_ for the sake of (M.); sa_rtha = caravan, troop, company (MBh.); sa_rthena = in company with (Skt.)(CDIAL 13364). Satthava_ha = caravan leader (Pali.Pkt.); satthavaha, sattha_ha (Pkt.); sa_tha_ = fellow-traveller, pilgrim, guide (B.); sa_thava_hu = caravan leader (OG.); satvu~ = merchant (Si.); satthava_hika = caravan leader (Pkt.); sa_thuya_, sa_tho = pilgrim's guide, companion (B.); sa_rthava_ha = caravan leader (MBh.)(CDIAL 13365). sa~_t = companion (Sh.); sa_th, sa_t = partner (M.); sa_than. = companion (M.); sa_thin (H.); satthuna = friend (Pali); sa_rthin = companion on a journey, merchant (MBh.)(CDIAL 13366). Cf. sa_th [Hem. Des. sattharo = Skt. samu_ha, a group; fr. Skt. sa_rtha, a caravan] company, society, association; fellowship; a partner; a company of persons on a visit of condolence (G.lex.)

svastika any lucky or auspicious object , (esp.) a kind of mystical cross or mark made on persons and things to denote good luck; amongst Jainas it is one of the 24 auspicious marks and is the emblem of the seventh Arhat of the present

Avasarpin2i1) Hariv. Kav. Pur. ; the crossing of the arms or hands on the breast MBh. a bandage in the form of a cross Sus'r. **svasti—** f. 'good fortune' RV. [su—2, √as 1] Pa. *suvatthi*—, *sotthi*— f. 'well—being', NiDoc. *śvasti*; Pk. *satthi*—, *sotthi*— f. 'blessing, welfare'; Si. *seta* 'good fortune' < **soti* (H. Smith EGS 185 < *sustha*—)(CDIAL 13915). **svastika—** '*auspicious', m. 'auspicious mark' R. [**SVASTÍ**—] Pa. *sotthika*—, *°iya*— 'auspicious'; Pk. *satthia*—, *sot°* m. 'auspicious mark'; H. *sathiyā*, *sati°* m. 'mystical mark of good luck'; G. *sāthiy*⍰ m. 'auspicious mark painted on the front of a house' (CDIAL 13916).

cf. svastha well, healthy (MaitrUp.)(CDIAL 13917). suttige rice and cocoanut kept for 'swastika', an auspicious ceremony; sutye to set apart some rice and/or cocoanut as an offering to a deity in order to cure some disease supposed to have occurred due to the wrath of that deity (Tu.lex.) s'asta auspicious, happy, well, right (Skt.Ka.); best, excellent (Ka.)(Ka.lex.) s's'te xuda_ God be praised (Pas'.); sattha praiseworthy (Pkt.); cust beautiful (Kho.)(CDIAL 12365). s'asya best, excellent; praiseworthy, laudable (Skt.lex.) s'asa_ praise, song of praise (RV. v.41.18); s'asta song of praise (VS. xxxiii.24; RV. iv.3.15)(Vedic.lex.) s'asti praise, eulogy; a hymn of praise (sto_tra)(Skt.lex.) s'am.s to praise, extol; s'am.str. a reciter of hymns; a praise, a panegyrist (Skt.lex.) ca_sta_ < s'a_sta_ nom. sg. of s'a_str. a village deity, aiyana_r (Cu_t.a_.); ca_sta_ppiri_ti feeding of brahmins for propitiating ca_sta_ (Na_.)(Ta.lex.) s'a_str. a teacher, an instructor; a ruler, king, sovereign; a father; a Buddha or Ji_na; or a deified teacher of the Buddhas or Jainas (Skt.lex.) s'a_s to instruct (RV. ii.28.9); to direct (RV. x.32.4); to command (RV. viii.34.1); to praise (RV. i.189.7); to guide (RV. vi.54.2); s'a_sa commander, ruler (RV. x.152.1)(Vedic.lex.) Well-being: suvatthi-, sotthi- well-being (Pa.); s'vasti (NiDoc.); satthi-, sotthi- blessing, welfare (Pkt.)(CDIAL 13915). svasti good fortune (RV.); suvatthi, sotthi well-being (Pali); s'vasti id. (NiDoc.); satthi, sotthi blessing, welfare (Pkt.); seta good fortune (Si. < *soti < sustha (CDIAL 13915). svastha well, healthy (MaitrUp.); sattha in good health (Pkt.); sasto (Gypsy); sa_stu (Phal.); sasti_ sound, healthy (Pas'.)(CDIAL 13917). suvastika_ a godess [suvatsa_ name of a Dikkuma_ri_ (Pa_rs'van.); suvaccha_ (Pkt.)];

sotthi [svasti (Skt.) = su + asti] well-being, safety, blessing; brings future happiness; sotthi hotu hail! sotthin in safety, safely; sotthina_ safely, prosperously; suvatthi id.; sotthi-kamma a blesing; sotthi-ka_ra an utterer of blessings, a herald; sotthi-gata safe wandering, prosperous journey; sotthi-gamana id.; sotthi-bhava well-being, prosperity, safety; sotthi-va_caka utterer of blessings, a herald; sotthi-sa_la_ a hospital (Pali). sotthika, sotthiya happy, auspicious, blessed, safe; di_gha-sotthiya one who is happy for long; sotthiyya = sotiya a learned man, a brahmin; sotthivant lucky, happy; sottha_na blessing, well-fare (Pali.lex.) cottu < svam neut.nom.sing. of sva one's own (RV.)(CDIAL 13893). property, possessions of two kinds (ta_varam and cankamam); gold (Ta.); sottu (Te.Ka.)(Ta.lex.) Swastika symbol: cuvasti < svasti a Sanskrit indeclinable denoting auspiciousness, used at the beginning of inscriptions, calendars, etc.; cuvastikam < svastika a mystical mark; a yo_gic posture. svasti-va_cana ve_da recited in the presence of idols taken in procession (Ta.lex.) svastika a kind of mystical mark (shaped like a Greek cross with the extremities of the four arms bent round in the same direction)(Ka.lex.) svastika (sva_sta s'ubha_ya hitam ka) a kind of mystical mark on persons or things denoting good luck; a lucky object

(Skt.lex.) svastis'ri_ a Sanskrit expression used at the beginning of inscriptions, letters, etc. to denote auspiciousness (Ta.lex.) cf. sotthika, sotthiya adj. (fr. sotthi) happy, auspicious, blessed, safe; sotthi (Skt. svasti = su + asti) well-being, safety, blessing (Pali.lex.) svasti welfare, happiness (RV. i.89.6); godess of welfare (RV. iii.38.9; TS. vi.1.5); svasti-ga_ leading to fortune (RV. vi.51.16); svasti-ta_ welfare (Aitre_ya A_ran.yaka. i.5.2); svasti-da_ giving happiness (RV. x.17.5); happy, fortunate, affording happiness (RV. vi.46.9); welfare (RV. x.101.7); leading auspiciously (AV. xiv.2.8)(Vedic.lex.) Image: svastika: sotthi-va_cakam < svasti-va_cana a portion of the Ve_das recited with a view to auspiciousness; Ve_da recited in the presence of idols taken in procession (Vina_yakapu. 15,117); co_taka-va_kkiyam mandatory precepts (Ci. Po_. Pa_. Avai. 15); co_ttam < sto_tra expr. of salutation from an inferior (Tiv. Periyati. 2,2,6); co_ttu id. (Tirukko_. 173)(Ta.lex.) svasti-s'ri_ a Sanskrit expression used at the beginning of inscriptions, letters, etc., to denote auspiciousness (Ta.lex.) co_ttikam < svastika_sanam a yo_gic posture symbolic of success, which consists in sitting with legs crosswise while the body is held erect and at ease (Pirapo_ta. 44,7); cuvattika_can-am id.; cuvattikam, cuvasti, cuvatti a Sanskrit indeclinable denoting auspiciousness, used at the beginning of inscriptions, calendars, etc; cuvastikam a mystical mark denoting auspiciousness; a yo_gic posture; cuvattikam a mystical design (Vina_yakapu. 15,48); a kind of sitting posture (Cilap. 8,25); co_ki < jo_gi (Ka.) < yo_gin a caste of itinerant Telugu mendicants, who are dexterous jugglers and snake-charmers, and claim a profound knowledge of charms and medicine (E.T. ii,494)(Ta.lex.) svasti good fortune (RV.); suvatthi, sotthi well-being (Pali); s'vasti (NiDoc.); satthi, sotthi blessing, welfare (Pkt.); seta good fortune (Si.)(CDIAL 13915). svastha well, healthy (MaitrUp.); sattha in good health (Pkt.); sasto (Gypsy); sa_stu (Phal.); sasti_ adj. sound, healthy (Pas'.)(CDIAL 13917). sotthika [svasti = su + asti (Skt.)] well-being, safety, blessing; brings future happiness; sotthi hotu hail! sotthin in safety, safely; sotthina_ safely, prosperously; sotthi-kamma a blessing; sotthi-ka_ra an utterer of blessings, a herald; sotthi-gata safe wandering, prosperous journey; sotthi-bha_va well-being, prosperity, safety; sotthi-va_caka utterer of blessings, a herald; sotthi-sa_la_ a hospital; sotthika, sotthiya adj. happy, auspicious, blessed, safe; sottha_na [svastyayana (Skt.)] blessing, well-fare; sovatthika safe; in the shape of a svastika; sovatthika_lanka_ra a kind of auspicious mark; sotthivant adj. lucky, happy, safe (Pali.lex.) svasti = welfare, happiness (RV 1.89.6; goddess of welfare (RV 3.38.9; TS 6.1.5: daivi_ svastih, pathya_m svastim, 'svasti sam.jn~a_ devata_')(Vedic.lex.) svastiga_ = leading to fortune (RV 6.51.16); svastita_ welfare (RV 1.5.2); svastida_ giving happiness (RV 10.17.5); svastimant happy, fortunate, affording happiness (RV 6.46.9); svastiva_h bringing welfare (RV 10.101.7); svastiva_han leading auspiciously (AV 14.2.8); svastyayan obtainment of welfare; procuring welfare (TS 1.2.9.1)(Vedic.lex.)

svastika the meeting of four roads; the crossing of the arms, making a sign like the cross (Skt.lex.) canti the cross roads, junction of three or more roads (Tirumuru. 225); cantikkarai junction where several roads meet (Ta.lex.)

svastika, svastikam a particular mode of sitting practised by yogins (Skt.lex.) kattari-co_ttikam < kartari + svastika gesture with both hands in which the fore-fingers of

either hand are stretched out together whilst the rest are kept bent to represent a pair of scissors, ear of corn, etc. (Parata. Pa_va. 64)(Ta.lex.) cuttika_tan-am < svastika_sana a yogic posture symbolic of success (Tirukka_l.at. 18,22)(Ta.lex.) s'ukta united, joined (Skt.lex.)

s'astra an instrument for cutting or wounding, a weapon; a sword, a knife, a scymitar, korahu (Ka.); iron; s'astraka iron (Skt.Ka.); s'astra-kriye weapon-business; s'astra_ji_va living by the profession of arms: a soldier (Ka.); s'astri a knife (Skt.Ka.)(Ka.lex.) Knife, dagger, adze; iron: s'astra instrument for cutting (S'Br.); iron (Skt.); s'astraka knife, iron (Skt.); s'astri_ knife, dagger (Skt.); sattha, satthaka knife (Pali); sattha dagger (Pkt.); satthia_ knife (Pkt.); s'astir, saster iron (Gypsy); s'eitr, s'e_l, leis' knife (Pas'.); s'e_thar, s'a_htar iron (K.); satthra_ adze (P.); sat-a weapon, instrument (CDIAL 12367).

satthia_ knife (Pkt.); s'astra instrument for cutting (SBr.); s'astraka knife, iron (SSkt.); s'astri_ knife, dagger (Skt.); sattha, satthaka knife (Pali); sattha dagger (Pkt.); s'astir, saster iron (Gy.); seitr knife (Pas'.); s'e_thar iron (K.); satthra_ adze (P.); sat-a weapon, instrument (Si.)(CDIAL 12367). sasa carpenter, wheelwright (Si.)(CDIAL 5621).   cf. kattari (Ta.); kattarisu (Ka.) to cut with scissors, clip, snip, shear (Ta.lex.); kattarikai (Perun.. Vattava. 14,7); a dance gesture: forefinger and middle finger are held together and pointed upward, while the thumb and the little finger remain bent, the little finger being kept stretched (Cilap. 3,18, Urai)(Ta.lex.) kartari scissors, knife (Sus'r.); kattari_ id., shears (Pali); scissors, shears (Pkt.)(CDIAL 2l858). { Two semantic streams lead into two morphemes: s'astra and kartari: s'astra instrument for cutting (S'Br.); sattha, satthaka knife (Pali); sattha dagger; satthia_ knife (Pkt.)(CDIAL 12367). < kati.r knife; katy knife (Ko.)(DEDR 1204); tar-ika a kind of axe, chisel (Ta.)(DEDR 3140) < tar.c to cut (Go.)(DEDR 3146).

śá�tr□— m. ‘one who cuts up’ AV. [√śas] H. ***sathi****yā* m. ‘surgeon, oculist’ (CDIAL 12366).

svasti a term of salutation [esp. in the beginning of letters] or of sanction or approbation) RV.
Svastika the meeting of four roads

�va�tikadAna n. crossing the hands Balar.

�va�tikIkRta mfn. crossed (as hands) Cat.

�va�tikayantra n. a surgical instrument of a partic. form Sus’r.

�va�tikakarNa mfn. marked on the ear with the figure called Svastika

�va�tikAGka mfn. marked with the Svastika cross , Bc.

Svastika a partic. mode of sitting practised by Yogins (in which the toes are placed in the inner hollow of the knees) Ma_rkP. Pan~car **�va�tika—** ‘*auspicious’, m. ‘auspicious mark’ R. [svastí—] Pa. *sotthika—*, *°iya—* ‘auspicious’; Pk. *satthia—*, *sot°* m. ‘auspicious mark’; H. ***sathi****yā*, *sati°* m. ‘mystical mark of good luck’; G. *sāthiy�* m. ‘auspicious mark painted on the front of a house’(CDIAL 13916).

�va�ti well-being , fortune , luck , success , prosperity RV. VS. S’Br. MBh. R. BhP.

svastidevI f. N. of a goddess (represented as wife of Va_yu and said to have sprung from the essence of Prakriti)

svastigA mfn. leading to fortune or prosperity RV.

svastivah carrying auspiciously (as a carriage ; others , `" conferring happiness "') RV.

svastivacana n. pronouncing the word %{svasti} , benediction MBh.

svastivacana n. pronouncing the word %{svasti} , benediction MBh.

svastimukha a letter (beginning with %{svasti})

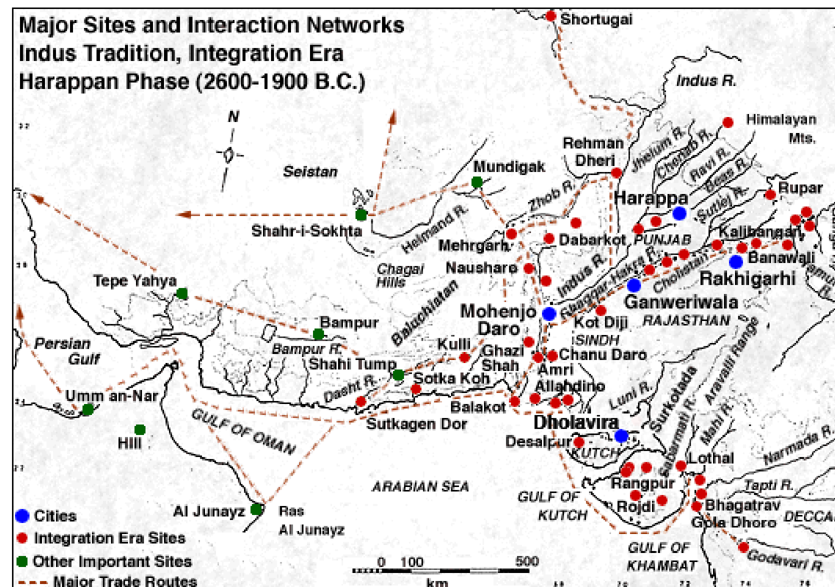
svastyayana `" to ask for a blessing "') AV. a vessel full of water borne in front of a procession, a collection of Mantras recited for good luck AV. Paris'

svastyaks.ara. expressing thanks for anything Hcat.

S. ***sathi**r?* f. 'bundle of straw'; L. *satthar* m. 'grass strewn on floor', awā. *sathur* 'mat'; P. *satthar* m. 'bed of straw', *satthrī* f. 'armful of straw'; G. *sāthrī* m. 'id.', *sāthrī* f. 'raft of bamboo made by Brahmans to keep various materials on by side of river for use of clients' (whence *sāthriy* m. 'dealer in sundry articles'); WPah.kg. (kc.) *sáthr* m. 'bed, bedding, bedding of pine needles for cattle', J. *sāthrā* m. 'bedding' (CDIAL 13883)

Reading new Bhirrana seals with Sarasvati hieroglyphs

This remarkable archaeological site of Bhirrana proves 1) the possibility of Vedic people who nurtured a civilization on the banks of River Sarasvati; and 2) the



continuity of culture in India into historical periods. (Map of major sites after J. Kenoyer)

Seals found in archaeological contexts of discoveries furnaces/hearths, copper celts, copper arrowheads, copper spearhead, copper bangles and beads provide the context confirming the readings of the Sarasvati hieroglyphs on seals based on the 5 volume work: *Indus script encodes mleccha speech* (http://sarasvati97.blogspot.com).

Source: http://asi.nic.in/asi_exca_2007_bhirrana_images.asp

Excavations - 2000-2005 – Haryana Bhirrana, dt.Fatehabad
Archaeological context



The site was excavated for two field seasons during 2003-04 and 2004-05. The excavation has reveled a well planned fortified Mature Harappan town datable to 3rd millennium B.C.. The massive fortification wall of the town was made of mud bricks. The houses were made of mud bricks. The other important findings from the excavation include steatite seals, beads of semi-precious stones, celts and bangles all belonging to mature Harappan culture.
http://asi.nic.in/asi_exca_2005_haryana.asp

The site is situated about 220 km to the northwest of New Delhi on the New Delhi-Fazilka national highway and about 14 km northeast of the district headquarter on the Bhuna road in the Fatehabad district. The site is one of the many sites seen along

the channels of the ancient Saraswati riverine systems, now represented by the seasonal Ghaggar River which flows in modern Haryana from Nahan to Sirsa…**Period IA: Hakra Wares Culture:** The excavation has revealed the remains of the Harappan culture right from its nascent stage, i.e. Hakra Wares Culture (antedating the Known Early Harappan Culture in the subcontinent, also known as Kalibangan-I.) to a full-fledged Mature Harappan city. Prior to the excavation of Bhirrana, no Hakra Wares culture, predating the Early Harappan had been exposed in any Indian site. For the first time, the remains of this culture have been exposed at Bhirrana. This culture is characterised by structures in the form of subterranean dwelling pits, cut into the natural soil. The walls and floor of these pits were plastered with the yellowish alluvium of the Saraswati valley. The artefacts of this period comprised a copper bangle, a copper arrowhead, bangles of terracotta, beads of carnelian, lapis lazuli and steatite, bone point, stone saddle and quern. The pottery repertoire is very rich and the diagnostic wares of this period included Mud Applique Wares, Incised (Deep and Light), Tan/Chocolate Slipped Wares, Brown-on-Buff Wares, Bichrome Wares (Paintings on the exterior with black and white pigments), Black-on-Red Ware and plain red wares. **The Period IB: Early Harappan Culture:** The entire site was occupied during this period. The settlement was an open air one with no fortification. The houses were built of mud bricks of buff colour in the ratio of 3:2:1. The pottery of this period shows all the six fabrics of Kalibangan - I along with many of the Hakra Wares of the earlier period. the antiquites of the period include a seal of quarter-foil shape made on shell, arrowhead, bangles and rings of copper, beads of carnelian, jasper, lapis lazuli, steatite, shell and terracotta, pendent, bull figurine, rattle, wheel, gamesman, and marbles of terracotta, bangles of terracotta and faience, bone objects, sling ball, marble and pounder of sandstone. **The Period IIA: Early Mature Harappan Culture:** This period is marked by transformation in the city lay-out. The entire settlement was encompassed within a fortification wall. The twin units of the town planning, viz. Citadel and Lower Town came into vogue. The mud brick structures were aligned with a slight deviation from the true north. The streets, lanes and by-lanes were oriented in similar fashion. The pottery assemblage shows a mixed bag of Early Harappan and Mature Harappan forms. The antiquities of the period included beads of semi-precious stones (including two caches of beads kept in two miniature pots), bangles of copper, shell, terracotta and faience; fishhook, chisel, arrowhead of copper; terracotta animal figurines and a host of miscellaneous artefacts. **The Period IIB: Mature Harappan Culture:** The last period of occupation at the site belong to the Mature Harappan period with all the characteristic features of a well developed Harappan city. The important antiquities of the period consisted of Seals of steatite, bangles of copper, terracotta, faience and shell, inscribed celts of copper, bone objects, terracotta spoked wheels, animal figurines of terracotta, beads of lapis lazuli, carnelian, agate, faience, steatite, terracotta and stone objects. A replica of the famous "Dancing Girl" from Mohenjodaro is found engraved on a potsherd in the form a graffiti. The massive fortification wall of the town was made of mud bricks. The houses were made of mud bricks (sun-baked bricks). Wide linear roads can be seen separating the houses. A circular structure of baked earth is probably a "tandoor"- a community kitchen still seen in rural India. Presence of the baked bricks is seen used in the main drain provided on the width of the northern arm of the fortification wall to flush out the waste water from the houses.

http://en.wikipedia.org/wiki/Bhirrana *Puratattva*, the Bulletin of the Archaeological Society of India No. 34, 35 and 36; Man and Environment xxxi.

Bhirrana: two levels of hearths



Furnace with terracotta bangles, Harappan Period (c. 2500 – 1900 BC), Bhirrana Circular



platforms? Harappan Period (c. 2500 – 1900 BC), Bhirrana
Copper Bangles, Harappan Period (c. 2500 – 1900 BC), Bhirrana
Copper celts, (c. 2500 – 1900 BC)
Copper arrowheads, (c. 2500 – 1900 BC)
Copper spearhead, (c. 2500 – 1900 BC)





Chert blades and Core, Harappan Period (c. 2500 – 1900 BC), Bhirrana









Beads of Lapis Lazuli (blue in colour) and Shell (while in colour), Harappan Period (c. 2500 – 1900 BC), Bhirrana A cache of beads in a small vase, beads of carnelian, lapis lazuli, shell, Harappan Period (c. 2500 – 1900 BC), BhirranaTerracotta wheels with painted spokes, (c. 2500 – 1900 BC)

Seals, Harappan Period (c. 2500 – 1900 BC), Bhirrana:



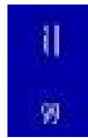
Bhirrana 1 Seal Bhirrana 1 Glyptic elements in compositions :

a. One horn kod. 'horn'; *kot.u* 'curved, bent (Ta.); rebus: kod. 'workshop'
b. Heifer damr.a 'heifer'; rebus: tam(b)ra 'copper'

c. Rings on neck kod.iyum ‘rings on neck’; rebus: kod.iyum, kahod.iyum ‘place where artisans work’
d. Pannier kamarsa_la ‘pannier’; rebus: kamar ‘smith’; sala ‘workshop’
e. Standard device gimlet sangad.a ‘gimlet’
f. Standard device portable furnace sangad.a ‘portable furnace’; janga_d.iyo ‘guard carrying treasure’ (G.) san:gha_d.iyo worker on a lathe (G.)

g. Nave of wheel era, eraka = nave of wheel (Ka.); rebus: era, eraka ‘copper’ (Ka.)

h. Six spokes a_ru ‘six’; ara_ ‘spokes’; ara ‘copper’ (Akkadian); a_raku_t.a ‘brass’ [ara_ ‘lion’ in Akkadian; hence, depiction of lion and heifer on early electrum coins of Lydia.]



i. Two short linear strokes; it can be read as ‘two’: bar, barea ‘two’; rebus: bar.ea ‘merchant’. Vikalpa (alternative): badhi = ‘to ligature, to bandage, to splice, to join by successive rolls of a ligature’ (Santali) bata_ bamboo slips (Kur.); bate = thin slips of bamboo (Malt.)(DEDR 3917). Ligature! badhi! This becomes a characteristic feature of the orthography of epigraphs. Rebus: bad.hi ‘professional carpenter’ (B.) Vikalpa: Rebus: [bhar an oven; *bharan* to spread or bring out from a kiln (P.lex.) *bhaha_ra_, bhaha_ri_* little earthen furnace (P.)(CDIAL 9482). *bari_* ‘blacksmith, artisan (Ashmolean)(CDIAL 9464). *bha_r* grain-parcher’s fireplace (Bi.); *bharsa_ri_* furnace, oven (Hindi)(CDIAL 9685).]

j. Circumgraph of four short linear strokes kod.a, kor.a = in arithmetic one; 4 kor.a or kod.a = 1 gan.d.a = 4 (Santali.lex.) got. = one (Santali) kod.a = in arithmetic, one (Santali) Rebus: kod.a, kor.a = shell (Santali) got. = one (Santali) kod.a = in arithmetic, one (Santali) Rebus: kod.a, kor.a = shell (Santali) *kod.a, kor.a* professional digger; an aboriginal tribe cognate to the Santals, and speaking a similar language; *kod.ra* to scourge; *khot.rao* to scrape out of a hollow, to gouge (Santali) *kod.* place where artisans work (G.)*; got.h, got.* place where cattle are collected at mid-day (Santali)

k. Fish bed.a hako = a species of fish (Santali); rebus: bed.a = one end of a hearth (Gujarati) hako = axe (Ho. Boda) A variant form of hako = ayo. Rebus: ayas ‘metal’; hence, bed.a hako can be read as: metal hearth.



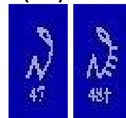
l. Lid ligatured atop fish d.aren, ad.aren to cover up pot with lid (Bond.a); d.arai to cover (Bond.a.Hindi) Rebus: aduru ‘native metal’ (Ka.), i.e. hearth for native metal. aduru = gan.iyinda tegadu karagade iruva aduru = ore taken from the mine and not subjected to melting in a furnace (Ka. Siddha_nti Subrahman.ya’ S’astri’s new interpretation of the Amarakos’a, Bangalore, Vicaradarpana Press, 1872, p. 330); adar = fine sand (Ta.); adaru = a sparkle (Te.); ayir – iron dust, any ore (Ma.)

Bhirrana 2

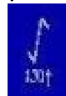
The composition of the animal :

One-horned heifer on Bhirrana Seal 1 has been explained. The readings are: kod. ‘horn’; kod.iyum ‘rings on neck’; pannier (not seen) ‘kamarsa_la’; rebus: kod., kod.iyum ‘artisans’ workshop’; kamar ‘smith’; sala ‘workshop’
mlekh (Brahui); mr..eka = goat (Te.) Rebus: milakkhu ‘copper’ (Pali) as in milakkhurajanam ‘copper-coloured’ (Pali); mleccha-mukha = copper (Skt.)
bali_varda bull (Skt.); ba-il (H.); Rebus : bali ‘sand ore’; as in: balimer.ed iron extracted from sand ore; mer.ed-bica = iron stone ore, in contrast to bali-bica, iron sand ore (Mu.lex.) *bali* = iron ore, iron stone sand; the Kol iron smelters wash the ore from the sand in the river bed; *balgada* ‘sand carried down by a flow of water’ (Santali) Vikalpa: baddi_ ‘ox’ (Nahali) Nahali *baddi* ‘bull’ Gutob of Bastar state *ba_d.i_* Rebus: bad.hi ‘carpenter’ (Santali).

It is unclear if a feeding trough is placed in front of the composite animal. d.a_n:gra_ = a wooden trough just enough to feed one animal. cf. id.ankar..i = a measure of capacity, 20 id.an:kar...i make a par-r-a (Ma.lex.) d.aNga_ = small country boat, dug-out canoe (Or.); d.o~ga_ trough, canoe, ladle (H.)(CDIAL 5568). d.hakkai = shuts (Pkt.); d.hakan.u to cover (S.); d.hakna_ cover of a grain-pot (Bi.); d.ha_ka_ large open basket (N.); d.ha_kar = a kind of large basket (N.)(CDIAL 5574). da_gara = a large flat basket woven of thin bamboo strips in which articles are fried or exposed to the sun; d.a_gara, d.a_gara_ = a large winnowing basket; a large shallow, square tray of bamboo splints (Te.) Rebus: d.hangar ‘blacksmith’ (H.)

The glyph in front of the antelope could be a variant of : 

V048panjhar ‘ribs’; rebus: pasra ‘smithy’; vikalpa: ko_lemmu = the backbone (Te.lex.) Rebus: kolame ‘furnace’ (Ka.) d.han:ga = a crook used for pulling down the branches of trees, for goats, sheep and camels (P.lex.) See also:

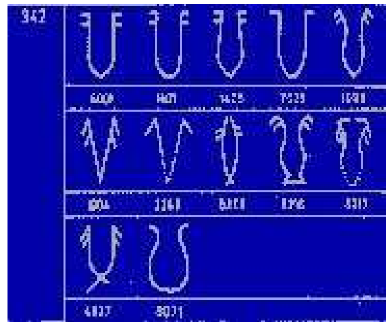


Sign 130 The glyph 'skeleton' may also be explained as rebus: da_kali, da_gali = an anvil (Te.lex.) d.ha~go = skeleton; lean (Ku.); d.a_n:ga = one who is reduced to a skeleton (Or.); d.a~_gar, d.a~_gra_ = starveling (H.); d.ha~_kal., d.ha_~ku_l. = old and decaying (M.); d.ege = old, weak (Wg.)(CDIAL 5524).

Rebus: d.a_n:ro = a term of contempt for a blacksmith (N.)(CDIAL 5524)

Vikalpa: ri_r. = backbone (WPah.) ri_rh = backbone (Aw.); ri_r.h (H.); ri_d.haka = backbone (Skt.)(CDIAL 10749a). sakam rir. = the mid-rib of a leaf (Santali) buru rir. = the ridge of the hill (Santali.lex.) Rebus: rīti— 2 f. ‘yellow **brass**, bell metal’ Kathās., *rītika*— n. ‘calx of **brass**’, *°kā*— f. ‘**brass**’ lex. 2. rīrī—, *rirī*— f. ‘yellow **brass**’ lex. [Ac. to AO xviii 248 Dard. forms < *raktikā—2] 1. Dm. *rit* ‘copper’, Gaw. *rīt* (→ Sv. *rīda*

NoPhal 49); Bshk. *rīd* ‘**brass**’, Tor. *žit* f. 2. Pk. *rīrī*— f. ‘**brass**’; Sh. *rīl* m. ‘**brass**, bronze, copper’(CDIAL 10752).



Sign 1: comparable to Sign 342 and variants. Sign 342 is the most frequently-occurring ‘sign’ on the corpus of inscribed objects.

Major sign on composition containing ‘signs’: Glyph of ‘rim of jar’ kan.d.a kan-ka rebus: khan.n.a = that which is dug (Pkt.lex.) khana = a trench, a pit, a hollow in the ground (Santali.lex.) [khan = a mine (Santali) ?khani = mine (VarBr.S.); khan.i = mine (Pkt.); khani (A.); khan (H.); khan. = mine, quarry (M.)(CDIAL 3813); cf. khana = a trench, a pit, a hollow in the ground (Santali.lex.)]. Kan.d. ‘fire-altar, furnace’. The glyph, thus connotes a furnace at the mouth of a mine, perhaps of copper. The word kan- in Tamil means ‘copper’.



Bhirrana 3
ra_n:ga ‘buffalo’; Rebus: ran:ga, ran: pewter is an alloy of tin lead and antimony (an~jana) (Santali). ran:ku 'tin' (Santali) Tin, solder: ran:ga tin (Skt.); ram.ga (Pkt.); ra~_g pewter, tin (P.H.); ra~_ga_ pewter, tin (P.H.); solder (Or.Bi.Mth.); ra_n. tin, solder (Ku.N.A.B.); ra~_k (Ku.); ra_n.o (N.); ra_n:ga tin (Or.); ra_n:ga_ solder (Or.); ra_m.ga (OAw.); ranga tin (Si.)(CDIAL 10562). ra_n.(g)ta_ tinsel, copper-foil (B.)(CDIAL 10567). Vikalpa: kat.iya_ buffalo heifer (G.); kad.a buffalo (Santali); kad.a = a buffalo (Santali.lex.) kat.a_damu = a he-buffalo (Te.lex.) Rebus: gad.a ‘mine’; .) ka_t.i, furnace (trench)(Ta.)

Vikalpa: The horns (normally recognizable on zebu or bos indicus glyphs) may be read independently : thAthAr ‘buffalo horns’; rebus: t.hat.hera ‘brass worker’. 5491 *�ha��ha— 1 ‘**brass**’. [Onom. from noise of hammering **brass**? — *�ha��h—] N. *�ha��ar* ‘an alloy of copper and bell metal’. *�ha��hakāra— ‘**brass** worker’. 2. *�ha��hakara—. [*�ha��ha—1, kāra—1] 1. Pk. *�ha��hāra*— m., K. *�hõdotdot;�hur* m., S. *�hã��hāro* m., P. *�ha�hiār*, *°rā* m. 2. P. ludh. *�ha�herā* m., Ku. *�ha�hero* m., N. *�ha�ero*, Bi. *�ha�herā*, Mth. *�ha�heri*, H. *�ha�herā* m. (CDIAL 5493).*tāmragha�a— ‘copper pot’. [tāmrá—, gha�a—1] Bi. *tamhe��ī* ‘round copper vessel’; — *tamhe�ā* ‘**brass**- founder’ der. **tamhe�* ‘copper pot’ (CDIAL 5782). *tāmragha�aka— ‘copper—worker’. [tāmrá—, gha�a—2] Bi. *tamhe�ā* ‘**brass**—founder’ (CDIAL 5783). tāmrika— ‘coppery’ Mn. [tāmrá—] Pk. *taṁbiya*— n. ‘an article of an ascetic's equipment (a copper vessel?)’; L. *trāmī* f. ‘large open vessel for kneading bread’, po�h. *trāmbī* f. ‘**brass** plate for kneading on’; Ku.gng. *tāmi* ‘copper plate’; A. *tāmi* ‘copper vessel used in worship’; B. *tāmī*, *tamiyā* ‘large **brass** vessel for cooking pulses at marriages and other ceremonies’; H. *tambiyā* m. ‘copper or **brass** vessel’. (CDIAL 5792).

Buffalo horns are ligatured to an elephant in the following example of a statuette; hence, buffalo may connote a 'metal' together with elephant and feline connoting metals: ib 'iron'; ibha 'elephant'; kol 'pancaloha or alloy of five metals'; kol 'tiger'; hence, buffalo can be read: ra_n:ga 'buffalo'; rebus: ra_nga 'tin' (Oriya):



Ligatured statuette: elephant, buffalo and feline. Nausharo. NS 91.02.32.01.LXXXII. C. Jarrige, 1992: 132-5. "Hollow three-headed animal figurine. The most complete figure is of an elephant with a hollow trunk. Two horns of a water buffalo curve along the cheeks of the elephant, and the bottom jaw of a feline with bared teeth appears at the back of the elephant's head. This complex figure is finely modeled and incised with delicate strokes to portray the character of the elephant. Such multiple-headed animals are depicted on seals and must represent important myths. This object may have been used as a puppet or sacred figure in a cult ritual. Ca. 2300-2200 BCE." (JM Kenoyer, 1998, p. 219).

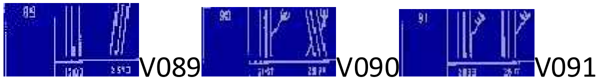
If the six numeral strokes have to be read together as connoting count 'six' :
Vikalpa 1: bhat.a 'six' (G.) Rebus: bhat.i 'smelter furnace' Vikalpa 2: khat.a = six (G.) ka_t.i, furnace (trench)(Ta.)

The glyph, 'three short numeral strokes' occurs twice and with a 'rice-plant' glyph. kolom 'three' (Austro-asiatic) kolmo 'rice-plant' (Santali) Rebus: kolmi 'smithy'(Go.) kolame a very deep pit, abyss, hell (Tu.)(DEDR 2157). kulume kanda_ya a tax on blacksmiths (Ka.); kol, kolla a furnace (Ta.) *kole.l* smithy, temple in Kota village (Ko.); *kwala.l* Kota smithy (To.); *konimi* blacksmith; *kola* id. (Ka.); *kolle* blacksmith (Kod.); *kollusa_na_* to mend implements; *kolsta_na, kulsa_na_* to forge; *ko_lsta_na_* to repair (of plough-shares); *kolmi* smithy (Go.); *kolhali* to forge (Go.)(DEDR 2133).] kolimi-titti = bellows used for a furnace (Te.lex.) kollu- to neutralize metallic properties by oxidation (Ta.lex.) kol brass or iron bar nailed across a door or gate; kollu-t-tat.i-y-a_n.i large nail for studding doors or gates to add to their strength (Ta.lex.) kollan--kamma_lai < + karmas'a_la_, kollan--pat.t.arai, kollan-ulai-k-ku_t.am blacksmith's workshop, smithy (Ta.lex.) cf. ulai smith's forge or furnace (Na_lat.i, 298); ulai-k-kal.am smith's forge; ulai-k-kur-at.u smith's tongs; ulai-t-turutti smith's bellows; ulai-y-a_n.i-k-ko_l smith's poker, beak-iron (Ta.lex.) [kollulaive_r-kan.alla_r: nait.ata. na_t.t.up.); mitiyulaikkollan- mur-iot.ir.r.an-n-a: perumpa_)(Ta.lex.) Temple; smithy: kol-l-ulai blacksmith's forge (kollulaik ku_t.attin-a_l : Kumara. Pira. Ni_tiner-i. 14)(Ta.lex.) cf. kolhua_r sugarcane milk and boiling house (Bi.); kolha_r oil factory (P.)(CDIAL 3537). *kulhu* 'a hindu caste, mostly oilmen' (Santali) kolsa_r = sugarcane mill and boiling house (Bi.)(CDIAL 3538).

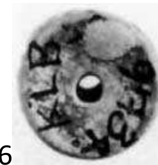
That the glyph 'three numeral strokes' has to be read rebus has been explained in context of ligatures and contextual occurrence as in the following examples:

Kalibangan029 8018 [ad.aren 'lid'; rebus: aduru 'native metal'; the ligatured glyph may thus connote a furnace for native metal.]



V089 V090 V091

Signs and sign variants 89 to 94 also indicate tha t the 'plant' glyph is ligatured to the three-linear-strokes glyph. This is an affirmation of 'plant' as a phonetic determinant of the three-linear-strokes glyph.

Kalibangan065aKalibangan065A6

Kalibangan065E 8024 Pict-104: Composition: A tree; a person with a composite body of a human (female?) in the upper half and body of a tiger in the lower half, having horns, and a trident-like head-dress, facing a group of three persons consisting of a woman (?) in the middle flanked by two men on either side throwing a spear at each other (fencing?) over her head.



Bhirrana 4 *d.abe, d.abea* wide horns (Santali) Rebus: *d.ha_ba_* workplace (P.) Vikalpa: mer.ha 'turned buffalo horns'; rebus: med.h 'iron'; mer.h 'chief'.

ran:ku = antelope (Santali) ran:ku = tin (Santali) Three numeral strokes on the short tail can also be explained: kolmo 'three'; rebus: kolmi 'smithy'.

bhat.a 'six' (G.) Rebus: bhat.i 'smelter furnace' Vikalpa: khat.a = six (G.) ka_t.i, furnace (trench)(Ta.) kolmo 'rice-plant'; kolmi 'smithy' (Go.) [See lexemes cited in earlier examples.]

Buffalo horns as Sarasvati hieroglyph (brassworker)
The link with Sarasvati hieroglyphs can be seen on the vase on stand shown at the bottom right of this photograph, an artifact discovered at Shahr-i-sokta in Seistan. The glyphs shown are: wide horns (buffalo-horns?) ligatured to a ficus leaf in the middle. A clear intimation of mint/smithy work.
ta_tta_ru 'buffalo horn'; rebus: t.hat.t.a_ro 'brass worker'; lo 'fig'; rebus: loa 'iron'. Thus the ligatured glyph on this vase denotes a metal worker working with iron and brass.



Cylinder seal of Ibni-sharrum, a scribe of Shar-kali-sharri (left) **and impression** (right), ca. 2183–2159 B.C.; Akkadian, reign of Shar-kali-sharri. Mesopotamia. Cuneiform inscription in Old Akkadian. Serpentine; H. 3.9 cm (1 1/2 in.); Diam. 2.6 cm (1 in.). Musée du Louvre, Département des Antiquités Orientales, Paris AO 22303.
http://www.metmuseum.org/special/First_Cities/firstcities_stop7.htm

Shahr-i-Sokhta in Seistan

Spelt as Shahr-i-sokta, shahr-e-sokhta, shahr-e-sukteh, shahr-e-sukhte, shahr-e-sookthe, shahr-e-soktha, the site of Sistan, Sistan and Baluchestan Province, is on a tentative list for consideration as a World Heritage site.

The site was close to an area of tin deposits; tin which was critical to create the bronze alloy metal.

At Shahr-I-Sokhte (Shah-I-Sokhta) in eastern Iran, a place through which large quantities of lapis lazuli from the Hindu Kush must have passed, worn stone drills and masses of chips of worked stone were found over large areas of the site…

[cf.A word cognate with Akkadian purkullu is: por-kollan- = kamma_l.an-, goldsmith (Tamil.lex.)] The Sumerian term for seal cutter is BUR.GUL; the Akkadian is purkullu…

"The richness of Tepe Yahya, Shahr-i-Sokhta, and Shadad, are all indicative of trade and 'an accumulation of wealth unsuspected from the area'. (Lamberg-Karlovsky, 1973, reviewing Masson and Sarianidi (1972) in Antiquity, 43-6)....Namazga-depe and neighbouring sites are a long way from the important tin reserves of Fergana...The origin of Near Eastern tin remains unproven; the geological evidence would favour the deposits of Fergana and the Tien Shan range..." (Penhallurick, R.D., 1986, Tin in Antiquity, London, Institute of Metals, pp. 18-32). See: Tosi, Maurizio,

1969, Excavations at Shahr-I-Sokhta. Preliminary report on the second campaign, September-December 1968, *East and West,* 19 (3-4): 283-386.

Susa, Tepe Yahya, Sahr-i-Soktha

"...(Sumerians of the Late Uruk period) established a colony on the acropolis of Susa (biblical Shushan, modern Shush), where the southern Iranian trade route to northwestern India began. Its original purpose was to obtain carnelian, the only ancient source of which was the Gujarat Peninsula. The presence of Uruk pottery at Yahya Tepe, the most important caravan city on that road, reveals that city's links with Susa. After about 3000 the so-called Proto-Elamites took over Susa, Godin Tepe, and other sites in Iran...One of the sites, Shahr-i-Sokhte, was located near an important area of tin deposits. With the start of the Bronze Age, tin became a major object of international trade, and Elam controlled its supply for a long time afterward... a long-lasting connection by land and sea was established between lower Mesopotamia and the Indus basin (which the Sumerians and Akkadians called Melukkha)." (Michael C. Astour, 1995, Overland trade routes in ancient Western Asia, in: Jack M. Sasson (ed.), *Civilizations of the Ancient Near East*, Vol. I, pp. 1401-1420).

Metals. Gold is known at Mokar, Afghanistan. (T.A. Wertime, Science 182, 1973, p. 884). "X-ray micro-analysis has shown that inclusions in the bead are composed of an alloy of platinum-iridium-osmium and gold. These three metals form rare alloys, found mostly in placer deposits...supplies from this area could have joined caravans carrying lapis-lazuli using Helmand valley route via Shahr-i-Sokhta to the Persian gulf and then have arrived by the ships carrying the lapis, carnelian, tin and gold from Meluhha to Sumer." (K.R. Maxwell-Hyslop, Sources of Sumerian Gold, Iraq, XXXIX, 1977, p.p.85-86).

"…the Greek geographer Strabo (first century BCE) does refer to tin from Dangiana, Iranian Seistan (15.2.10), a reference that certainly could be seen within the context of an overland trade route through Shahr-I-Sokhta and Mundigak and on to Susa…

"…not one of the oxide ingots from Crete is made of Cypriot copper, all of those found outside Crete were made of Cypriot copper…This also includes all of the ingots (at least all of those tested: oxhide, bun, and slab ingots) from Cape Gelidonya and Uluburum shipwrecks. This would mean that Cypriot copper was the predominant metal for the bronze industries across the Mediterranean, from Syria to Sardinia, from about 1300 BCE on…"

The emergence of the Iron Age (c. 1000 BCE)…'The simplicity of iron-working took metallurgy out of the palace, just as the alphabet had done for the art of writing.' (p. 1517).

[James D. Muhly, Mining and metalwork in ancient Western Asia in: Jack M. Sasson, ed., 1995, *Civilizations of the ancient Near East,* New York, Charles Scribner's Sons, pp. 1501-1521].



Shahr-i Sokhta

Shahr-e Sukhte or Shahr-i Sokhta (Persian for "burnt city") is an archaeological site of a sizable Bronze Age urban settlement.

Archived Picture - Director of Archeological Station of Shahr-e Sukhtah (Burnt City) in Zabol, Sistan-Baluchestan province said that for the first time in the city, all historical structures which have architectural value will be restored and preserved.

Shahr-e Sukhtah in Iran undergoing restoration Tuesday, October 02, 2007 - ?2005 IranMania.com
LONDON, October 2 (IranMania) - Director of Archeological Station of Shahr-e Sukhtah (Burnt City) in Zabol, Sistan-Baluchestan province said that for the first time in the city, all historical structures which have architectural value will be restored and preserved.
Alireza Khosravi told ISNA that the undertaking is aimed at preserving structures which, following excavations, were exposed to erosion by water, wind and rain.

?Entire external surface of the structures will be thatched with clay and straw to protect the structures against erosion,? he said.
Khosravi further referred to the architectural value of the Khakh-e Sukhtah (Burnt Palace) monument and said the edifice will be roofed with metal shingles.

http://www.iranmania.com/News/ArticleView/NewsPic.asp?News_Code=54665&News_Kind=CurrentAffairs&Image_Code=10162&Image_FileName=topburnt-city020305.jpg&Image_Language=1

Shahr-e Sookhteh (Burnt City); an Interview With Mansour Sajjadi
Tuesday, 31 December 2001

The head of excavation team in Shahr-e Sookhteh (Burnt City), Dr. Mansour Sajjadi said that this southeastern town dates back to 3200 BC and was destroyed in 2000 BC. Physicians in this town had the ability to conduct brain surgery some 4800 years ago and the city was a bustling trade town between the east and the west in its hay days.

Dr. Mansour Sajjadi the head of excavation team in Shahr-e Sookhteh talks quite enthusiastically and excitedly about his findings in that ancient city. However, he does gripe and complain about severe lack of funds for archeological excavations, maintaining and safeguarding already discovered archeological sites and artifacts as

well as for introducing these ancient remains to the rest of the world.

Dr. Sajjadi has a bachelor's degree from Tehran University and a Ph.D. from an Italian university. His life is spent between Shahr-e Sookhteh where he spends half of the year, and Italy where he spends the other six months of the calendar year with his children and Italian wife.

Q: First and foremost, please tell us where exactly is Shahr-e Sookhteh located at? Kindly give us some precise details of the city as well.
A: Shahr-e Sookhteh refers to the ancient hills situated in the road between Zabol and Zahedan. Any ancient hill usually has two names. An original old name usually given to it in ancient times and a new name given to it by us today. The name Shahr-e Sookhteh is a designation given to this place by the local people. The reason being that people passed by this place and saw the ruins of broken clay, destroyed walls and demolished structures and since they figured there once a city stood here and it was burned down and destroyed, hence they called it Shahr-e Sookhteh (Burnt City).

Q: What do you mean by a new name? How long ago?
A: Approximately 200 years ago.

Q: When you say new, nobody immediately thinks of 200 years ago, what's new about 200 years ago?
A: For us archeologists 200 years ago is just a blink of an eye and is not old at all. In fact, it is very new. In any event, there is a writing dating back to 200 years ago from an archeologist called Goldsmith in which he refers to this area as Shahr-e Sookhteh.

Q: What was Shahr-e Sookhteh called before then?
A: We do not know yet. However, a British archeologist had suggested that Shahr-e Sookhteh is the ancient city of Arata, which the Sumers had trade and other dealings with. There are some written evidence from the Sumeri civilization that refers to the city of Arata, which was located in eastern Iran. However, a few years ago, one of my professors, Dr. Majidzadeh proved beyond any practical doubt that Shahr-e Sookhteh could not be Arata and Arata is the archeological find of Shahrdad City near Kerman.

Q: Is there any way to find out what the original name of Shahr-e Sookhteh was?
A: There is only one way remaining and that is to get access to the archives of Shahr-e Sookhteh. Like any other ancient city Shahr-e Sookhteh must have an archive where documents were filed.

Q: How can you be so sure that this city had an archive?
A: We have already found a tablet here as an artifact, which was most probably a receipt or evidence of a transaction that was recorded on this tablet.

Q: What does the text say?
A: A "five" is written there which is visible, but everything else is unreadable. Nonetheless, five is a unit of grain. It was probably either wheat or barley. There are

also other artifacts unearthed by us as well as other archeologists that strongly suggest that an archive did in fact exist in Shahr-e Sookhteh. All we have to do now is



to find it. However, the truth is that finding an archive in a city as large as Shahr-e Sookhteh (151 hectares) is not an easy task at all.

Q: Shahr-e Sookhteh dates back to which era?

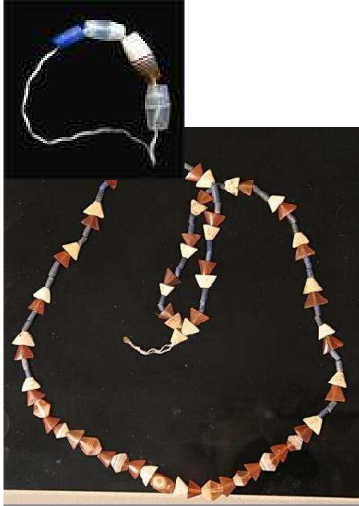


A: This city was established sometime in 3200 BC and was burned to the ground in circa 2000 BC. The city was a bustling town for a 1200-year period. Back then, there were only 5 or 6 towns like Shahr-e Sookhteh in the entire world. When founded the city was only about 15-16 hectares, but it gradually developed and grew into a larger town. By 2700 BC, Shahr-e Sookhteh was a major city. Some 100-200 years after that, the residents of the city began to migrate from the city and the city became smaller and smaller. The reason for the people leaving Shahr-e Sookhteh was more due to political and governmental crisis than geographical or climatic.

Q: Please elaborate on your claim that Shahr-e Sookhteh was deserted because of political crisis
and not geographical factors and kindly provide some evidence.
A: It was definitely not a geographical issue, because the region had sufficient water during that era.

Q: Dr. Sajjadi, how can you tell a city that stood thousands of years ago in this spot faced a political-governmental crisis?
A: An archeologist looks at a number of different factors and surrounds himself with various possibilities and asks a number of questions. By a process of elimination, we deduce the likeliest scenario possible. This method is utilized when we find an artifact such as a bowl or saucer and we try to determine for what purpose it was used for all the way to deducing why a city such as Shahr-e Sookhteh was abandoned, deserted, destroyed, etc.

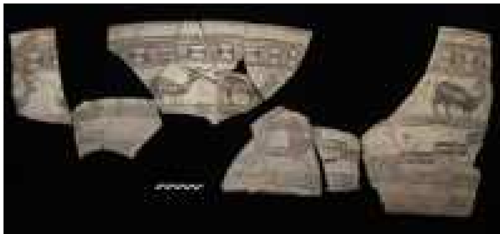
Q: Your response didn't completely convince me. How on earth is it possible to speculate and determine that 5000 years ago a political crisis or a war took place.
A: When a city grows and develops like Shahr-e Sookhteh did a long time ago, it is evidence that the city had a strong central administration. When you talk about an administration the discussion naturally turns political. This administration had an administrator such as a king, mayor, etc. as well as many advisers and aides who would be considered his cabinet and government members.



This is not just guesswork. Hard evidence of such administrations exists in similar archeological finds and ancient cities previously dug up by scientists. We still haven't found all the relevant signs, signals and evidence in Shahr-e Sookhteh, but indirect evidence bear witness to the fact that Shahr-e Sookhteh had an administration and a government. Various industries, trade and other business thrived in Shahr-e Sookhteh.

http://www.cais-soas.com/News/2001/December2001/31-12.htm

See: Photo gallery of Shah-re sookthehttp://www.pbase.com/panda/shahre_sokhte www.shahr-i-sokhta.ir



Stierfigur (Periode III) Pakistan: Sohr Damb/Nal



http://www.dainst.org/index_592_de.html www.dainst.org/medien/de/ufv-SD10-k.jpg Shahr-e Sokhte Neeklace Shahr-e Sokhte, Ostan-e Sistan va Balochestan 3rd mill. BCE

Shahr-e Sokhte Bronze Statue Shahr-e Sokhte, Ostan-e Sistan va Balochestan 3rd mill. BCE

Shahr-e Sokhte Pottery Vases Shahr-e Sokhte, Ostan-e Sistan va Balochestan 3rd mill. BCE

The link with Sarasvati hieroglyphs can be seen on the vase on stand shown at the bottom right of this photograph. The glyphs shown are: wide horns (buffalo-horns?) ligatured to a ficus leaf in the middle. A clear intimation of mint/smithy work.



Shahr-e Sokhte Wooden Comb Shahr-e Sokhte, Ostan-e Sistan va Balochestan 3rd mill. BCE



http://members.virtualtourist.com/m/tt/9910b/

See also: Scythian Horse Breast-Plate with relief of man holding 2 bulls 1000-800 BC Tap-e Hassanlo, Ostan-e Azarbaigan Scythian (an intimation of the motif of holding back two animals as shown on Sarasvati hieroglyphs with a woman holding back two rearing tigers).

It is an archaeological site located south of Zabol in the Balochistan region of eastern Iran. It has yielded important information on Chalcolithic(Bronze Age) settlement in the Helmand River valley during the 3rd millennium BC. Excavation of the site was done in 1967 by the Centre of Archaeological Studies and Excavations of the Italian Institute for the Middle and Far East www.shahr-i-sokhta.ir/photogallery/goat.jpg

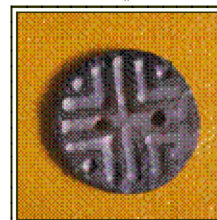




http://historyhuntersinternational.org/index.php?page=221 www.shahr-i-sokhta.ir/.../sofal-shahr-s.jpg



Two compartmental seals discovered and metalwork at Shahr-e-sukhta :



در ميان اشياء پيدا شده تعداد قابل توجهي اشياء و ابزاري كه از آنها مي توان با عنوان ابزار كنترل و قدرت نام برد پيدا شده اند. اين گروه از اشياء را مهر هاي مختلف، اثر مهر، اثر مهر و موم و طناب كشي ظروف بزرگ و در هاي اتاقها و انبارها ، سرپوشهاي مهر شده، ديسك هاي مثلث و گرد محاسباتي و مانند آن تشكيل ميدهند. طناب و حصير، نشان دهنده استفاده از آنها براي مهر كردن در انبار ها و يا ظروف بسيار بزرگ انباري بوده است. آثار مهر در روي دهانه ظروف كوچكتر با حجم هاي بسيار كوچك نيز بصورت ديسك هاي گلي گرد و مهر شده ديده شده اند.

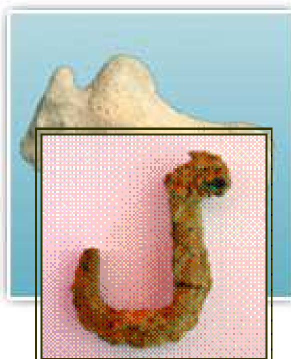


كليه بقاياي مهر و موم هاي پيدا شده در بناهاي يادماني توسط مهر هاي سنگي و فلزي مهر شده اند. بيشتر اثر مهر ها نشان از شكل هندسي مهر ها دارند كه چهار گوش يا مربع بوده اند. نقوش مهر ها ي فلزي بيشتر هندسي ميباشند اما اثر مهر هاي ديگري كه داراي نقشهاي گياهي، جانوري يا نقش پرنده هستند نيز در ميان نمونه ها ديده شده است. اطلاعات بدست آمده از اين مهر ها و اثرات آنها از نظرهاي گوناگون مهم ميباشند و بويژه براي تصحيح گاهنگاري و پيدا كردن مسير ارتباطات خارجي شهر بكار گرفته مي شوند.

شود بزودی مطالب دیگری اضافه می

http://www.shahr-i-sokhta.ir/shahre_sokhte.htm





جانوران براحتي قابل تشخيص هستند، اما تشخيص تعداد ديگري از آنها به آساني ممكن نيست و تنها از روي شكل ظاهري آنان مي توان تا حدودي به نوع آنها پي برد. در ميان اين گروه از جانوران مي توان به كفتار، پلنگ، قوچ، شتر و پرنده اشاره كرد.

محصولات کشاورزی در طول هزاره سوم بیش از میلاد در شهر سوخته وجود نداشته است تا جایی که اطلاعات موجود نشان می دهند در خلال 5هزار سال گذشته تغییرات بسیار مهم آب و هوایی چنان که بتواند محیط زیست را به کلی دگر گون کند در سیستانب وقوع نپیوسته تنها اتفاق مهم طبیعی تغییرات مکرر بستر رودخانه هیرمند بوده که ان هم تنها در سرزمین های کناره ای این رودخانه موثر بوده است بنابراین می توان به این نتیجه رسید که برخی از محصولات کشاورزی مورد نیاز شهر سوخته از مناطق اطراف به این شهر وارد می شده اند .

http://www.shahr-i-sokhta.ir/shahre_sokhte.htm

Ref.: 5185 Description

Covering some 120 Hectares and located along the Zabol-Zahedan Highway, the historic site of Shahr-e Sukhte is the most important prehistoric city of the 3rd millennium BC and a key location for Iranian prehistoric studies, particularly concerning the southeastern region, and a connection point between Near Eastern civilization and that of the Indus valley. The findings of the archaeological excavations and researches as well as laboratory studies, have provided ample data about third-millennium BC civilization in Iran and the country's prehistory in general.
Justification for Outstanding Universal Value
Satements of authenticity and/or integrity
Archaeological excavations and researches carried out on the artifacts and relics unearthed on this site.
Comparison with other similar properties
Mohenjo-Daro and Harappa sites in Pakistan and other Iranian archaeological sites of the third and second millennia BC such as Tape Shahdad and Susa.
http://whc.unesco.org/en/tentativelists/5185/

Monday 26 Nov 2007

Google translate:

A team will study the famous Italian "Šamana the eye golden"

It 'a real enigma the discovery in Iran, Shahr-i Sokta, on the border with Afghanistan, the remains of a Šamana with a golden eye. The discovery and 'made in late 2006 by Iranian archaeologists led by M. Sajjadi dell'Iranian Centre for Archaeological Research () 1967 thanks to funding from the Ministry of Foreign Affairs of the Cultural Heritage, the Museum of Oriental Art by Italian for Africa el ' East (ISIAO) already 'ISMEO the Institute founded by the great explorer of Africa, Professor Joseph Tucci. But the story of the priestess with the golden eye and 'yet to be written and a new mission will start' on November 30 to continue searches to Shahr-i Sokhta and resume analysis of ocular prosthesis in collaboration with colleagues Iranians . The woman was one metre high and 82 cm and had characteristics africanoidi, pronounced jaw, perhaps the dark. "To discover it were the Iranian archaeologists digging in huge necropolis - says all'Agi Lorenzo Costantini, head of the Italian mission in Shahr-i Sokta -. The city 'was on the border with the Battriana and was a very lively place, the crossroads of East caravans that were in the West. The burial dates back to 5000 years ago. The golden eye was embedded into left. And so 'have rediscovered scholars, who immediately launched investigations to find out whether in the history of archaeology there had similar experiences, but have not yet found any. "When the woman died '- adds Costantini - was buried with his fake eye, a leather purse to safeguard it, a mirror, a necklace of turquoise and lapis lazuli, vases and cups of clay. So not support a rich, in fact, it was forbidden to exhibit shamans valuable assets, and that, in addition to reflection on the fact that few could afford an eye laminated gold led the reasoning on the assumption that can be a Šamana ". "We Italians - explains the expert bioarcheologia - and 'been asked to study the prosthesis to discover what material and' made. So 'we have the eye to a series of analysis and we find that this is a half-sphere diameter of about three

centimeters and the radius of 1.5 and probably built with pasta bitumen. Externally there is' a reason incidentally: a small central circle from which eight lines radially. There are two holes where he spent a string that allowed bring avvolgendola around the head like a blindfold pirate. There are traces of thin gold foil, which form the veins of the eye ". In short, scholars, the eye should not be responsible for replacing the lost, but probably should be part of a ritual, perhaps linked to the spread of new religions in the area, home, subsequently, Zoroastrianism. [Act] - Rome, November 21

Un'équipe italiana studierà la famosa "sciamana dall'occhio d'oro"
http://archeoblog.net/wp-content/uploads/2007/11/sciamana.jpg

[Agi] - E' un vero e proprio enigma il ritrovamento in Iran, a Shahr-i Sokta, al confine con l'Afghanistan, dei resti di una sciamana con un occhio d'oro. La scoperta e' stata fatta alla fine del 2006 dagli archeologi iraniani diretti da M. Sajjadi dell'Iranian Centre for Archaeological Research (ICAR), coadiuvati dalla missione italiana che opera nella zona dal 1967 grazie ai finanziamenti del ministero degli Esteri, quello dei Beni Culturali, dal museo di Arte Orientale dall'Istituto Italiano per l'Africa e l'Oriente (ISIAO) gia' ISMEO l'Istituto fondato dal grande esploratore di quei territori, il Professor Giuseppe Tucci. Ma la storia della sacerdotessa con l'occhio d'oro e' ancora tutta da scrivere e una nuova missione partira' il 30 novembre per continuare le ricerche a Shahr-i Sokhta e per riprendere le analisi della protesi oculare in collaborazione con i colleghi iraniani. La donna era alta un metro e 82 centimetri e aveva caratteristiche africanoidi, la mascella pronunciata, forse la pelle scura. "A scoprirla sono stati gli archeologi iraniani scavando nella enorme necropoli - dice all'Agi Lorenzo Costantini, capo della missione italiana a Shahr-i Sokta -. La citta' si trovava a ridosso del confine con la Battriana ed era un luogo molto vivace, crocevia delle carovane che da Oriente venivano in Occidente. La sepoltura risale a 5000 anni fa". L'occhio d'oro era incastonato nell'orbita sinistra. E cosi' l'hanno ritrovata gli studiosi, che subito hanno avviato delle indagini per capire se nella storia dell'archeologia ci fossero esperienze simili, ma non ne hanno trovata ancora nessuna. "Quando la donna mori' - aggiunge Costantini - fu sepolta con il suo occhio finto, una borsetta di pelle per custodirlo, uno specchio, una collana di turchese e lapislazzuli, vasi e coppe di terracotta. Dunque non un corredo ricco, infatti, agli sciamani era proibito ostentare beni preziosi, e questo, oltre alla riflessione sul fatto che pochi potevano permettersi un occhio laminato d'oro ha portato il ragionamento sull'ipotesi che possa trattarsi di una sciamana". "A noi italiani - spiega ancora l'esperto di bioarcheologia - e' stato chiesto di studiare la protesi per scoprire di che materiale e' fatta. Cosi' abbiamo sottoposto l'occhio ad una serie di analisi e abbiamo stabilito che si tratta di una mezza sfera dal diametro di circa tre centimetri e dal raggio di 1,5 e costruita probabilmente con pasta di bitume. Esternamente c'e' un motivo inciso: un piccolo cerchio centrale dal quale partono otto linee a raggiera. Ci sono poi due fori in cui passava una cordicella che consentiva di portarla avvolgendola intorno alla testa come fosse una benda da pirata. Ci sono tracce di lamina d'oro sottilissima, che forma le venature dell'occhio". Insomma, per gli studiosi, l'occhio non doveva avere

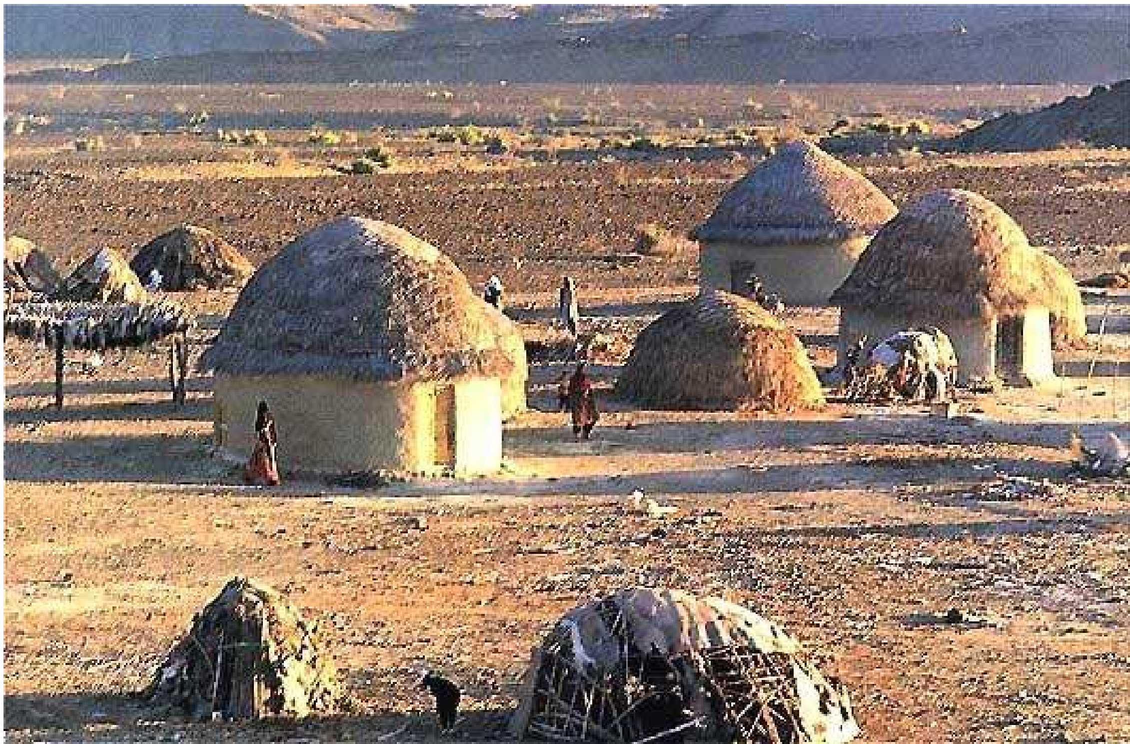


il compito di sostituire quello perduto, ma probabilmente doveva far parte di un rituale, forse legato al diffondersi di nuove religioni nella zona, patria, successivamente, dello zoroastrismo. [agi] - Roma, 21 nov
Fonte:
http://www.agi.it/cronaca/notizie/200711211251-cro-rt11056-art.html



INDO-PARTHIAN, Seistan. Gondophares. Circa 20-60 AD. ? Tetradrachm (24mm, 8.85 gm). Uncertain mint in Arachosia. Diademed and draped bust right / Nike standing right, holding wreath and palm. Senior 213.1bT; MIG 1084. Fine, dark greenish-brown patina.

http://ancientcoinscatalog.narod.ru/page6/page6.htm



Baluch village in Seistan region of Iran. This photo depicts apparently sedentary village life with round mud walls with a thatch roof composed of reeds. Photo courtesy Baloch Circle http://www.tcoletribalrugs.com/article9baluch.html

sal = Indian Gaur, *Bos Gaurus* (or, *Gavaeus Gaurus*). Rebus : *sal* = v. open a smithy, work a smithy; open a beer-shop, a sugar-cane press*; ale manjhi tolare kamarko sal akata* = the blacksmiths have a smithy in that part of the village where our headman has his house; *teken kamarko sal akata* = the blacksmiths are working to-day (have started their forge)(Santali.lex.Bodding)

The orthographic components of the glyphs may be seen as : 1. overflow (water); 2. buffalo horn; 3. pot; 4. kneeling (position); 5. person. The cuneiform text explains the owner of the cylinder seal to be a scribe.

The lexemes are: lo ‘to overflow’; tatta_ru (buffalo horn); man.d.i ‘pot’; man.d.i ‘kneeling’; man.d.i ‘person’.

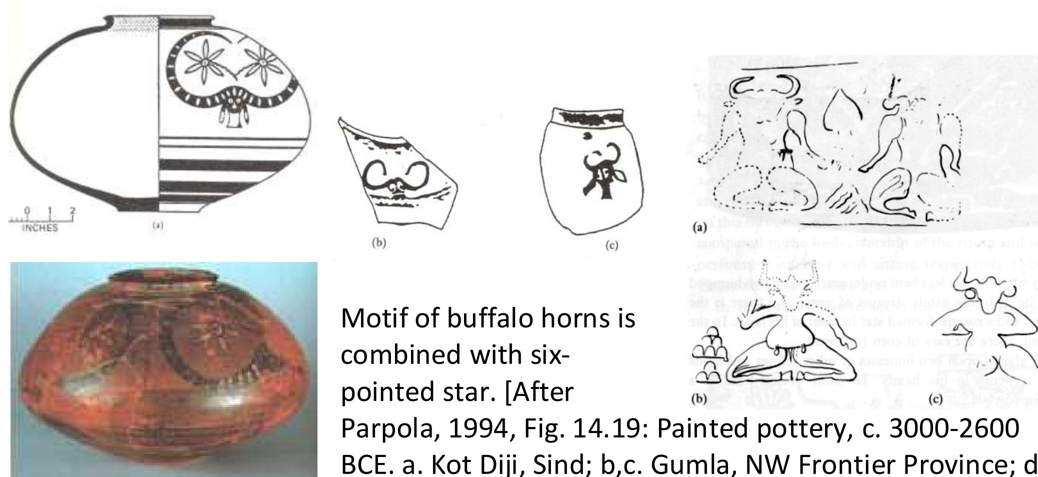
Homonyms (Rebus) are: loa ‘iron’; �ha�hero ‘brass worker’*;* man.di ‘brass utensil’, ‘assembly, company’, ‘warehouse’. (**man.d.a_** = warehouse, workshop (Kon.lex.)

The seal, thus connotes a metal worker who makes brass utensils in an assembly (of metal workers).

Vikalpa: mer.ha ‘turned buffalo horns’; **mer.go** adj. rimless (vessels); having horns twisted backwards,buffalo) (Santali) rebus: med.h ‘iron’; mer.h ‘chief’.

Vikalpa: **d.abe, d.abea** ‘large horns, with a sweeping upward curve, applied to buffaloes’; d.abea kad.a = a buffalo with large curved horns; d.abe deren = horns as described (Santali) Buffalo (wide horns): *d.abe, d.abea* wide horns; *d.ab, d.himba, d.hompo* ‘lump (ingot?)’ (Santali);

The following interpretation of the lexemes and corresponding homonyms will explain that the cylinder seal depicts a brass worker, who possesses a warehouse (for iron ore and brass metal). Being a metal worker, he has the competence to be a scribe (using ib ‘iron’ – cf. nib (English) – to inscribe on copper plates or even on serpentine cylinder seals). He is a man.d.itR = one who adorns. **maNDita** mfn. adorned , decorated MBh. Ka_v.; m. (with Jainas) N. of one of the 11 Gan.a_dhipas; **maNDitR** mfn. adorning, one who adorns (= ornament) Ba1lar.

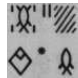


Motif of buffalo horns is combined with six-pointed star. [After Parpola, 1994, Fig. 14.19: Painted pottery, c. 3000-2600 BCE. a. Kot Diji, Sind; b,c. Gumla, NW Frontier Province; d. Burzahom, a Kashmir Neolithic site. After H.D. Sankalia, 1974, *The prehistory and protohistory of Bha_rata and Pakistan.* Poona, 354, fig. 88: k].

Buffalo's horns. Gumla, NW Frontier province. After Sankalia 1974: 354, fig. 88: b (=b), c (=c)

Furnace or forge of a smith; a goldsmith's smelting pot; torch: ukka_ (Vedic ulka_ and ulkus.i_; Latin volcanus; Old Irish olca_n to be fiery) firebrand, glow of fire, torch; tin.-ukka_ firebrand of dry grass; ukka_ a furnace or forge of a smith; a meteor; ukka_-dha_ra a torch-bearer; ukka_-pa_ta falling of a firebrand, a meteor; ukka_-mukha the opening or receiver of a furnace, a goldsmith's smelting pot = kamma_r'uddhana (Pali);

Meteor, to shine ul.ku, ul.uku (Ka.); ulka_ (Skt.); ul.ku = to shine (Ka.); ukka_ (Pkt.)

 m0305AC 2235 Pict-80: Three-faced, horned person (with a three-leaved pipal branch on the crown with two stars on either side), wearing bangles and armlets. Two stars adorn the curved buffalo horns of the seated person **with a plaited pigtail**. The pigtail connotes a pit furnace:

kamad.ha, kamat.ha, kamad.haka, kamad.haga, kamad.haya = a type of penance (Pkt.lex.) Rebus: kamat.amu, kammat.amu = portable furnace for melting precious metals (Te.) kampat.t.am = mint (Ta.) kammat.i_d.u = a goldsmith, a silversmith (Te.) kampat.t.tam coinage coin (Ta.); *kammat.t.am kammit.t.am* coinage, mint (Ma.); *kammat.a* id.; *kammat.i* a coiner (Ka.)(DEDR 1236)

The twig ligatured to the buffalo horn: **man.d.a** = a branch; a twig (Te.lex.) rebus: **man.d.a_** = warehouse, workshop (Kon.lex.)

Re<lo->(B) {V} ``(pot, etc.) to ^overflow''. <lo->(B) {V} ``(pot, etc.) to ^overflow''.

loa 'fig' (Munda)

Rebus: Re<lua>(B),,<loa>(B) {N} ``^iron''. Pl. <-le>.

<tAttARu>(L) {N} ``^buffalo horn''. #64001. <tEtAru>(S) {N} ``long ^horn, kind of ^conch''. #64010.

So<tAttARu>(L) {N} ``^buffalo horn''. ***Ta.*** **tutt&abrevmacr;ri** a kind of bugle-horn. ***Ma.*** **tuttāri** horn, trumpet. ***Ka.*** **tutūri, tuttāri, tuttūri** a long trumpet. ***Tu.*** **tuttāri, tuttūri** trumpet, horn, pipe. ***Te.*** **tutārā** a kind of trumpet. / Cf. Mar. **tutārī** a wind instrument, a sort of horn. (DEDR 3316).

TaTTura m. the sound of a drum (Skt.)

a_ra = n. brass BhP. x , 41 , 20 ; iron

Rebus: ***ha hakāra—** 'brass worker'. 2. ***ha hakara—.** [*ha ha—1, kāra—1] 1. Pk. *ha hāra*— m., K. *hõdotdot;hur* m., S. *hã hāro* m., P. *ha hiār*, *°rā* m. 2.

P. ludh. �*ha*�*herā* m., Ku. �*ha*�*hero* m., N. �*ha*�*ero*, Bi. �*ha*�*herā*, Mth. �*ha*�*heri*, H. �*ha*�*herā* m. (CDIAL 5493). ***�ha��h—** ‘strike’. [Onom.?] N. �*ha*�*āunu* ‘to strike, beat’, �*ha*�*āi* ‘striking’, �*ha*�*āk*—�*hu*�*uk* ‘noise of beating’; H. �*ha*�*hānā* ‘to beat’, �*ha*�*hāī* f. ‘noise of beating’.(CDIAL 5490). ***�ha��ha—** 1 ‘brass’. [Onom. from noise of hammering brass? — *�ha��h—] N. �*ha*��*ar* ‘an alloy of copper and bell metal’.(CDIAL 5491).
Ta.* ta��u (ta��i-)** to knock, tap, pat, strike against, dash against, strike, beat, hammer, thresh; ***n. knocking, patting, break- ing, striking against, collision; **ta��am** clapping of the hands; **ta��al** knocking, striking, clap- ping, tapping, beating time; **ta��ā�** gold or silver smith; *fem.* **ta��ātti. *Ma.* ta��u** a blow, knock; **ta��uka** to tap, dash, hit, strike against, knock; **ta��ān** goldsmith; ***fem.*** **ta��ātti; ta��āran** washerman; **ta��ikka** to cause to hit; **ta��ippu** beating. ***Ko.*** **ta�- (tac-)** to pat, strike, kill, (curse) affects, sharpen, disregard (words); **ta� �- (c)** to stagger from fatigue. ***To.*** **to�** a slap; **to�- (to�y-)** to strike (with hammer), pat, (sin) strikes; **to�- (to�-)** to bump foot; **to�xn, to�xïn** goldsmith; ***fem.*** **to�ty, to�xity; to�k ïn- (i�-)** to be tired, exhausted. ***Ka.*** **ta��u** to tap, touch, come close, pat, strike, beat, clap, slap, knock, clap on a thing (as cowdung on a wall), drive, beat off or back, remove; ***n.*** slap or pat, blow, blow or knock of disease, danger, death, fatigue, exhaustion. ***Ko�.*** **ta��- (ta��i-)** to touch, pat, ward off, strike off, (curse) effects; **ta��ë** goldsmith; ***fem.*** **ta��ati** (Shan- mugam). ***Tu.*** **ta��āvuni** to cause to hit, strike. ***Te.*** **ta��u** to strike, beat, knock, pat, clap, slap; ***n.*** stripe, welt; **ta�ravāmacr;�u** goldsmith or silversmith. ***Kur.*** **ta�nā (ta�cas)** to flog, lash, whip. ***Malt.*** **ta�ce** to slap. Cf. 3156 Ka. **tā�u**. / Cf. Turner, *CDIAL*, no. 5490, ***�ha��h-** to strike; no. 5493, ***�ha��hakāra-** brassworker; &root; **ta�**, no. 5748, **támacr;�a-** a blow; no. 5752, **tā�áyati** strikes. (DEDR 3039).

taptá— ‘heated, hot’ RV. [√tap] Pa. ***tatta***—, *°aka*— ‘hot, burning’, Pk. ***tatta***—, Gy. pal. *tátă*, arm. *tatav*, eur. *tato*, �. *t* *l/ *ta*, f. *°ti*, Tir. *táta*, Wo�. *tat*, f. *tyet*, Bshk. *t* *l *tt*, f. *t* e *tt*, Phal. *tāto*, f. *°ti*, Sh.gil. *tātu*�, koh. *tăto*, gur. *tāttŭ*, K. *totu* , S. *tato* (pp. of *tapa*�*u*), L. *tattā* (pp. of *tappa*�), P. *tattā*, WPah.bhad. *tattū*, pā�. *tāttā*, cur. *tattā*, Ku. *tāto*, gng. *tāt*, N. *tāto*, B. *tāt*, Or. *tatā*, OAw. *tātā*, lakh. *tāt*, H. *tāt*, *tātā*, *tattā*, Marw. *tāto*, G. *tātũ.* — Verbal pres. stems formed from past participle: K. *tatun* ‘to become hot’; Ku. *tato*�*o* ‘to warm’; N. *tātnu*, *tātinu* ‘to be hot, be energetic’, *tatāunu* ‘to warm’; B. *tātā* ‘to be heated’, *tātāna* ‘to heat’, Or. *tātibā*, *tāteibā*; Bhoj. *tātal* ‘to be hot’; H. *tatānā* ‘to heat’; — M. *tātăv*�*ẽ* ‘to be worried’ (LM 346) rather < tānta—. — Ext. —*ll*—: B. *tātal* ‘hot, Or. *tātalā*, *°tilā*, Bhoj. H. *tātal.* *taptakāri—, *taptagha�a—, *taptārā—. Addenda: **taptá—:** WPah.k�g. (kc.) *tatt*� ‘heated, hot’, J. *tātā*, Garh. *Tātū* (CDIAL 5679).

taptagha�a—** ‘heated pot’. [taptá—, gha�a—1] P. ***tatta� f., *tatah*�*ā*, *°hi*�*ā* m. ‘large earthen pot for boiling water in’, H. *tatah*�*ā*, *°hrā* m., *°hrī* f., *tatai*�*ā*, *°te*�*ā* m. (CDIAL 5681). [Note : A heated pot overflows.]

***taptārā—** ‘hot spike’. [taptá—, ārā—] Ku. *tatār* ‘red—hot needle (for pricking an abscess &c.)’ (CDIAL 5682).

So<usi-mAr>(L) {N} ``a ^mischievous man''. |<mAr>\<mAnDra> `person'. |<mAr>\<mAnDra> `man'. ***Ka.*** **mandi, mande** persons, people. ***Tu.*** **mandi, mandè** id.

Te. **mandi** crowd, collection of persons; retinue, following, infantry. ***Kol.*** (SR.) **mandī** men; (Kin.) **mandi** man. ***Pe.*** **mandanakar, madanakar** people belonging to the same side or party(DEDR 4700). Go<manda>(Z) [manda] {N} ``^group''. *Des.<manda>(G),<ma~da> `crowd, flock, herd'.

<mAnDi>//<m+n>(Z) {N} ``a brass ^utensil''. #45031.

Glyph: *mandar.i, mandar.ia* 'a drummer, drum musicians' (Santali)

Go<manDi>(ZA) {NB} ``^knee''. *Des.<maNDi>(GM) `knee'.
Gu<ma~Di>,,<manDi>(R4) {NB} ``^knee''. *Des.<maNDi>(GM).

Ta. **ma��i** kneeling, kneeling on one knee as an archer. ***Ma.*** **ma��uka** to be seated on the heels. ***Ka.*** **ma��i** what is bent, the knee. ***Tu.*** **ma��i** knee. ***Te.*** **ma��&ibrevmacr;** kneeling on one knee. ***Pa.*** **ma�tel** knee; **ma�i ku�tel** kneeling position. ***Go.*** (L.) **me��ā**, (G. Mu. Ma.) **min�a** knee (***Voc.*** 2827). ***Kon�a*** (BB) **me�a, me��a** id. ***Pe.*** **men�a** id. ***Man�.*** **men�e** id. ***Kui*** **men�a** id. ***Kuwi*** (F.) **menda**, (S. Su. P.) **men�a**, (Isr.) **me��a** id. Cf. 4645 Ta. **ma�a�ku (ma�i**-forms). / ? Cf. Skt. **ma��ūkī-** part of an elephant's hind leg; Mar. **me�** knee-joint. (DEDR 4677).

Ta. **ma��u** hall of assembly, golden hall of Chidambaram, court of justice, arbitration court, cow-stall, herd of cows, raised platform under a tree for village meet- ings, centre of a garden, junction of four roads or streets; **ma��am** hall, assembly, court, meeting place under a tree in a village, open space used for riding horses, plain, open space, central place in a battlefield, Chidam- baram, house, cowshed, long street; **ma��al** marriage, long street; **ma��a�** Śiva; **ma��-il** courtyard of a house; **ma��u (ma��i-)** to fine, punish. ***Ma.*** **mannu** place of judgement or assembly; **mannam** standing place, place of judgment or discussion. ***Ko.*** **man�** Toda mund (i.e. village); burning place for dry funeral; **mandm (*obl.* mandt-)** meeting. ***To.*** **mo� (*obl.* mo�t-)** locus of tribal activity, including village with dairy, dairy apart from village, and funeral place; patrilineal clan. ***Ka.*** **mandu** hamlet of the Todas on the Nilagiri. ***Ko�.*** **mandï** village green. (DEDR 4777). (*a*) ***Ta.*** **mantai** flock, herd, common pasture of a village, open space in the middle of a village common to the community. ***Ka.*** **mandi, mande** flock of sheep or goats, herd of cattle or buffaloes, open place in the jungle or near a village where a flock or herd stands, pen, fold. ***Te.*** **manda** flock, herd, drove, pack, (B. also) place where flocks or herds are kept outside a village, hamlet inhabited by herdsmen. ***Pa.*** **manda** herd, flock; company, association. ***Go.*** (F-H. Ma. S.) **manda** herd, flock (***Voc.*** 2704). ***Kon�a*** **manda** herd. ***Kuwi*** (Isr.) **manda** herd, flock. (*b*) ***Ka.*** **mandi, mande** persons, people. ***Tu.*** **mandi, mandè** id. ***Te.*** **mandi** crowd, collection of persons; retinue, following, infantry. ***Kol.*** (SR.) **mandī** men; (Kin.) **mandi** man. ***Pe.*** **mandanakar, madanakar** people belonging to the same side or party. (DEDR 4700).

ma��apa— m.n. 'open temporary shed, pavilion' Hariv., °*pikā*— f. 'small pavilion, customs house' Kād. 2. **ma��apa—** m.n. lex. 3. ***ma��haka—.** [Variation of �� with �� supports supposition of non—Aryan origin in Wackernagel AiGr ii 2, 212: see EWA ii 557. — Prob. of same origin as ma�ha—1 and ma��a—6 with which NIA. words

largely collide in meaning and form] 1. Pa. *ma��apa—* m. ‘temporary shed for festive occasions’; Pk. *maṁ�ava—* m. ‘temporary erection, booth covered with creepers’, *°viā—* f. ‘small do.’; Phal. *ma��au* m. ‘wooden gallery outside a house’; K. *man�av* m. ‘a kind of house found in forest villages’; S. *manahũ* m. ‘shed, thatched roof’; Ku. *mã�yā*, *manyā* ‘resthouse’; N. *kā�hmã�au* ‘the city of Kathmandu’ (*kā�h—* < kā��há—); Or. *ma��uã* ‘raised and shaded pavilion’, *pa�ā—ma��oi* ‘pavilion laid over with planks below roof’, *mu��oi*, *°�ei* ‘raised unroofed platform’; Bi. *mã�o* ‘roof of betel plantation’, *mã�uā*, *ma�°*, *malwā* ‘lean—to thatch against a wall’, *ma�aī* ‘watcher's shed on ground without platform’; Mth. *mā�ab* ‘roof of betel plantation’, *ma�wā* ‘open erection in courtyard for festive occa- sions’; OAw. *māṁ�ava* m. ‘wedding canopy’; H. *mã�wā* m., *°wī* f., *ma��wā* m., *°wī* f. ‘arbour, temporary erection, pavilion’, OMarw. *maṁ�avo*, *mā�hivo* m.; G. *mã�av* m. ‘thatched open shed’, *mã�v�* m. ‘booth’, *mã�vī* f. ‘slightly raised platform before door of a house, customs house’, *mã�aviy�* m. ‘member of bride's party’; M. *mã�av* m. ‘pavilion for festivals’, *mã�vī* f. ‘small canopy over an idol’; Si. *ma�u—va* ‘hut’, *ma�a* ‘open hall’ SigGr ii 452. 2. Ko. *māṁ�av* ‘open pavilion’. 3. H. *mã�hā*, *mā�hā*, *mã�hā* m. ‘temporary shed, arbour’ (cf. OMarw. *mā�hivo* in 1); — Ku. *mã�ā* m.pl. ‘shed, resthouse’ (or < ma��a—6?] *chāyāma��apa—. Addenda: **ma��apa—:** S.kcch. *mā��hvo* m. ‘booth, canopy’. (CDIAL 9740).

Mu. *gaja maND* `cooked rice beginning to spoil'.

Kon�a **ma��i** earthen pan, a covering dish. ***Pe.*** **man�i** cooking pot. ***Kui*** **man�i** brass bowl. ***Kuwi*** (S.) **mandi** basin; (Isr.) **ma��i** plate, bowl. (DEDR 5678). Cf. 4682 Ta. **ma��ai**. (DEDR 4678). ***Ta.*** **ma��ai** mendicant's begging bowl, earthen vessel, head, skull, cranium, brain- pan, top portion as of palms, a standard of measure. ***Ma.*** **ma��a** skull; similar objects. ***Ko.*** **ma��** head. ***To.*** **ma�** id. ***Ka.*** **ma��e** id.; (Hav.) **ma��age** a big jar. ***Ko�.*** **ma��e** head. ***Tu.*** **ma��è** large earthen vessel, skull, head. ***Kor.*** (M.) **ma��a**, (O. T.) **man�e** head. Cf. 4678 Kon�a **ma��i**. / Cf. Skt. (*lex.*) **ma��a-** head.(DEDR 4682).

Gy. eur. *men* f. ‘nape of neck, neck, throat’, in wel. *mend —d* is secondary from *mendrī* ‘necklet’ < *menrī* ext. with *—�a—* (LM 386, DGW iv 219 < *mányā—* with unexpl. *e*); Bshk. *ma�* ‘neck’; Sh. *mā�i* f. ‘Adam's apple’ with unexpl. *ā*; K. *müñü—gô�u* m. ‘flesh of nape of neck’, *m°—gö�ü* f. ‘nape of neck’; S. *ma�i* f. ‘vertebrae of neck’; M. *ma�ī* f. ‘clitoris, knob of wood, pulley block’. — Ext. with *—kk—*: S. *ma�iko* m. ‘vertebrae of neck, Adam's apple’; L. *ma�kā* m. ‘nape of neck, vertebra of neck’; G. *ma�k�* m. ‘single vertebra of neck’; M. *ma�kā* m. ‘Adam's apple, amulet worn round neck’ .— X skandhá—: Ash. ***mandâ*** ‘neck’, Wg. *mõmacr;da*, *mũda*; Paš. ***mandâ*** m. ‘neck’, ku�. ***mandelík*** ‘throat’; Shum. *mádolik* ‘neck’, Ni�g. *mũnd�*, Gaw. ***manda***, Sv. ***mandapilê.*** — With unexpl. contaminations or addi- tions: Kt. *maŕa�ŕík* ‘neck’; WPah.khaś. *manthī* ‘back of neck’, marm. *manā��ī*, bhad. *mi��ū*; N. *man�o*, *mun�o* ‘head, neck’. — Par. *ma��́ (CDIAL 9732).*

Ta. **ma��u (ma��i-)** to blaze up, glow; **ma�u (-pp-, -tt-)** to kindle. ***Te.*** **ma��u** to burn, blaze, flame, cause or produce a burning pain, be angry, be in a fury or violent rage, be envious; **ma��a** flame, blaze, burning pain, anger, wrath, fury, envy; **ma��incu** to

burn (***tr.***), inflame, provoke, irritate; **ma��u** great heat, redhot iron, brand; very hot; (K.) **mrandu** to be consumed by fire, burn. ***Kol.*** (Pat., p. 167) **man�eng** to burn, scorch *(intr.). Nk.* **man�-** to burn *(intr.). Go.* (M.) **ma�gānā** to blaze; (Ma.) **ma�g-** to burn ***(intr.) (Voc.*** 2745); (Tr.) **ma�ūstānā** to cook in oil (***Voc.*** 2743); (ASu.) **ma�ū-** (curry) to be charred. ***Kui*** **m�ahpa (m�aht-)** to consume by fire, burn; ***n.*** destruction by fire. Cf. 4801 Ta. **mā��u**.(DEDR 4680).



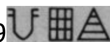
m1430At Pict-101: Person throwing a spear at a buffalo and placing one foot on its head; three persons standing near a tree at the centre. 2819 Pict-60: Composite animal with the body of an ox and three heads [one each of one-horned bull (looking forward), antelope (looking backward) and bison (looking downwards)] at right; a goat standing on its hindlegs and browsing from a tree at the center.


Mesopotamia. Cylinder seal, ca. 2254-2220 BCE (mature); ceramic; cat. 79; two groups in combat. A naked, bearded hero wrestles with a water buffalo, and a bull-man wrestles with a lion. In the centre: inscription (unread).

Appears to be recut. Pictorial motif: Person grappling with two tigers standing on either side of him and rearing on their hindlegs.

Person throwing a spear at a buffalo and placing one foot on the head of the buffalo.

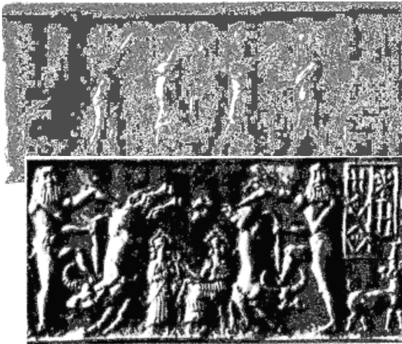
2279 seal impression, Mohenjodaro (DK 8165); after Mackay 1938: pl.88, no.279


m0269  2663  h171A  h171Btablet


4312 Buffalo.  m0312 Persons vaulting over a water-buffalo.
kambal.a = a buffalo race (Ka.); **kambula, kambul.a** = a buffalo race in a rice field (Tu.)(DEDR 1239). Khamd.a, khamd.ao = to gambol, to sport, to flirt (Santali) Rebus: kand. 'fire altar, furnace'; kad.a 'buffalo'; rebus: kadaio 'turner' (G.)
kat.iya_ buffalo heifer (G.); kad.a buffalo (Santali); **kad.a** = a buffalo (Santali.lex.)
kat.a_damu = a he-buffalo (Te.lex.) Rebus: gad.a 'mine'
ka_t.i, furnace (trench)(Ta.)

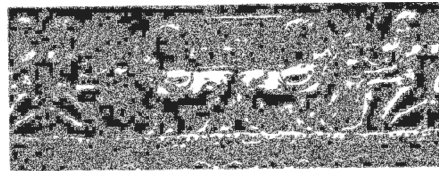

Akkadian cylinder seal. Inscription: 'Naram-Sin of Akkad: Ukin-Ulmash his son'. The 'Sarre cylinder',

Collection Othmar Keel, Fribourg; cf. Collon 1987: no. 528 Buffalo in conflict with a lion.



Akkadin cylinder seal. A person ligatured to a bull fights a buffalo; a person ligatured to a bull fights a lion. The Oriental Institute of Chicago (AS. 33: 113). After Boehmer 1965: no. 230

Late Akkadian cylinder seal. Enki, 'water-god' sits between two buffaloes. The fighter on either side places a foot on the head of the buffalo. After Boehmer 1965: no. 223



A late Akkadian cylinder seal ca. 2200 BCE.Musee du Louvre/AO 22303 (Collection De CLercq). Water flows from the pot of Enki and is offered to the two buffaloes. Inscription: 'S'argalis'arri, king of Akkad: Ibnis'arrum, the scribe, (is) your servant'. After Boehmer 1965: no. 232. Cf. Colloon 1987: no. 529.



m0304AC The importance of the ‘body’ glyph is seen in the Seal m0304 Text 2420 where the glyph appears together with the glyphs of: buffalo, tiger, rhinoceros and elephant, all surrounding the horned, seated person. A pair of ‘antelopes’ also adorn the platform on which the person is seated in a yogic posture.

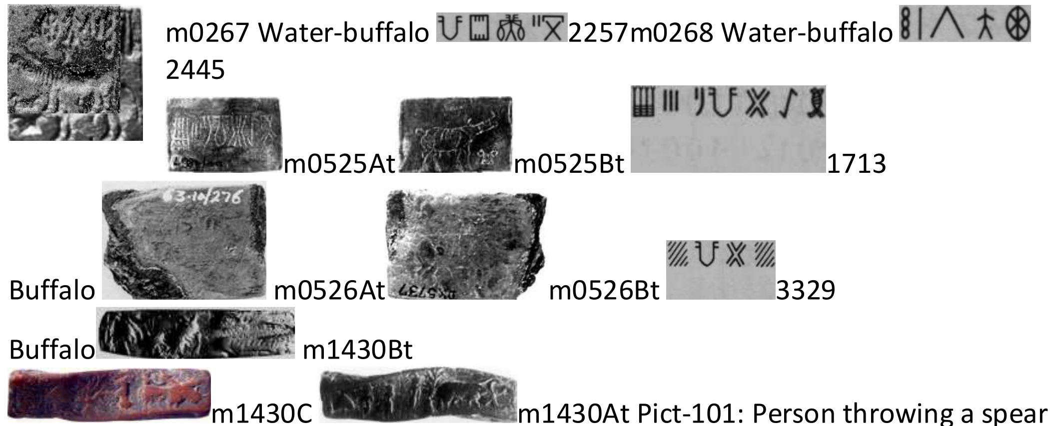


Unprovenanced Harappan-style cylinder seal impression; Musee du Louvre; cf. Corbiau, 1936, An Indo-Sumerian cylinder, *Iraq* 3, 100-3, p. 101, Fig.1; De Clercq Coll.; burnt white agate; De Clercq and Menant, 1888, No. 26; Collon, 1987, Fig. 614. A hero grasping two tigers and a buffalo-and-leaf-horned person, seated on a stool with hoofed legs, surrounded by a snake and a fish on either side, a pair of water buffaloes. Another person stands and fights two tigers and is surrounded by trees, a markhor goat and a vulture above a rhinoceros. Text: 9905 Prob. West Asian find Pict-117: two bisons facing each other.

Glyph: *daeka* ‘wide-spreading horn’; *d.aeka kad.ru* ‘a buffalo having long, spreading horns with an upward turn’ (Santali) [Sometimes, two stars are depicted in the curve of the horns; rebus: *t.aka* ‘silver’?]

deko = a Hindu (Santali)

ra~_go buffalo bull (Ku.N.)(CDIAL 10559). ra_ngo = buffalo (Santali); kuranga = antelope (Sanskrit); ran:ku = antelope (Santali) ran:ku = tin (Santali)
Buffalo on Sarasvati epigraphs



m0267 Water-buffalo 2257m0268 Water-buffalo 2445

m0525At m0525Bt 1713

Buffalo m0526At m0526Bt 3329

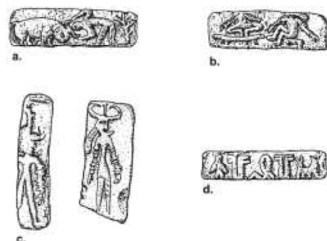
Buffalo m1430Bt

m1430C m1430At Pict-101: Person throwing a spear at a buffalo and placing one foot on its head; three persons standing near a tree at the centre. 2819 Pict-60: Composite animal with the body of an ox and three heads [one each of one-horned bull (looking forward), antelope (looking backward) and bison (looking downwards)] at right; a goat standing on its hindlegs and browsing from a tree at the center.



Harappa. Two tablets. Seated figure or deity with reed house or shrine at one side. Left: H95-2524; Right: H95-2487.

Harappa. Planoconvex molded tablet found on Mound ET. A. Reverse. a female deity battling two tigers and standing above an elephant and below a six-spoked wheel; b. Obverse. A person spearing with a barbed spear a buffalo in front of a seated horned deity wearing bangles and with a plumed headdress. The person presses his foot down the buffalo’s head. An alligator with a narrow snout is on the top register. “We have found two other broken tablets at Harappa that appear to have been made from the same mold that was used to create the scene of a deity battling two tigers and standing above an elephant. One was found in a room



located on the southern slope of Mount ET in 1996 and another example comes from excavations on Mound F in the 1930s. However, the flat obverse of both of these broken tablets does not show the spearing of a buffalo, rather it depicts the more well-known scene showing a tiger looking back over its shoulder at a person sitting on the branch of a tree. Several other flat or twisted rectangular terracotta tablets found at Harappa combine these two narrative scenes of a figure strangling two tigers on one side of a tablet, and the tiger looking back over its shoulder at a figure in a tree on the other side.” [JM Kenoyer, 1998, p. 115].

Sarasvati hieroglyphs from Charsadda (Bala Hissar)



Charsadda or Bala Hissar has been occupied since 1300 BCE

This picture is taken from ‘Charsadda Revisited’ referenced below (a follow up of the earlier excavations done by Mortimer Wheeler). The blurb notes: “The ‘mother goddess’ figurine from the basal levels of Charsadda is very similar to examples from the northern valleys.”

This is an extraordinary specimen of a woman marked with a glyph of ‘three linear strokes’ repeated about nine or ten times, so that there is no ambiguity whatsoever that this glyph of a numeral of ‘three linear strokes’ is meant to be an integral part of the figurine. That this is from the basal levels of Charsadda or Bala Hissar points to its antiquity closer to the date of occupation which is said to be c. 1300 BCE.

The ‘three linear strokes’ glyph is a Sarasvati hieroglyph. It is not a mere numerical count.

The word for three is kolmo (Munda). Homophone: kola ‘woman’ (Nahali) (Hence the use of the glyph of ‘three linear strokes’ as a phonetic determinant ligatured on the figurine).

Rebus: kolami ‘furnace’ (Telugu).

Mleccha speakers and mlecchita vikalpa scribes seem to have been present in Charsadda to create this hieroglyph figurine.

At this archaeological site, there are other signature tunes which provide links to Sarasvati civilization: finds of carnelian beads (carnelian a unique resource from Gujarat), lapis lazuli jewellery (lapis from Afghanistan), cowrie (from nearby Gulf of Kutch or Persian Gulf).

And this hieroglyph figurine of a woman ligatured with ‘three linear strokes’ glyph.

CHARSADDA REVISITED

Recent investigation of the artefacts from the lowest levels of Charsadda reveals that they are much older than Wheeler thought. Rather than being Persian in origin, they are closely associated with the prehistoric communities of the valleys to the north of the Vale of Peshawar.

The 'mother goddess' figurine from the basal levels of Charsadda is very similar to examples from the northern valleys

Sherds of burnished red ware from the basal levels of Charsadda also link the site with the northern valleys of Swat and Dir.

Distribution map of mother goddess figurines and burnished red ware sites in the Vale of Peshawar and the northern valleys, demonstrating shared material culture.

The majority of sites in the northern valleys yielding burnished red ware are megalithic graves belonging to the 'Gandharan Grave Culture', which is dated c.1700–1300 BCE.

The Charsadda Project was jointly established by the University of Peshawar and the University of Bradford in order to re-examine the earliest levels of the site and re-assess their dates.

Between 1993 and 2000, the Project conducted six seasons of archaeological investigations at the site, and trained British and Pakistani students in archaeological fieldwork.

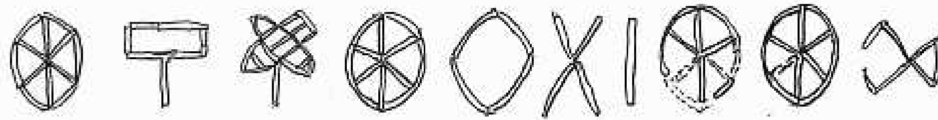
7

http://www.dur.ac.uk/arch.projects/charsadda/Exhibition7.html

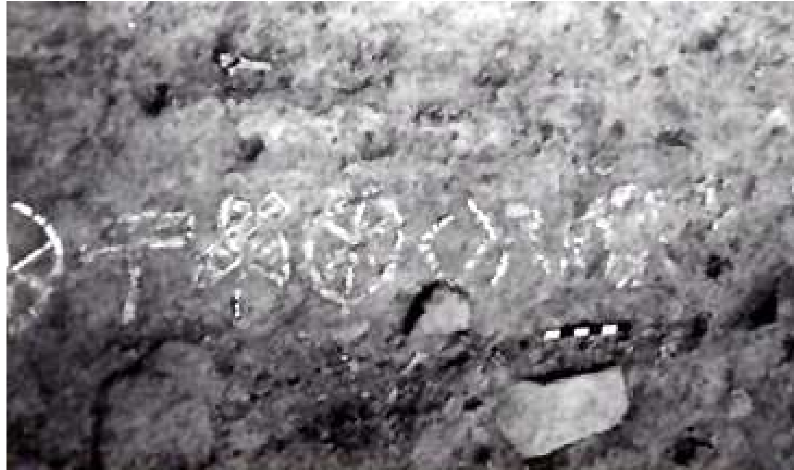
http://sarasvati97.blogspot.com/2008/03/dholavira-inscriptions-of-smithymint.html

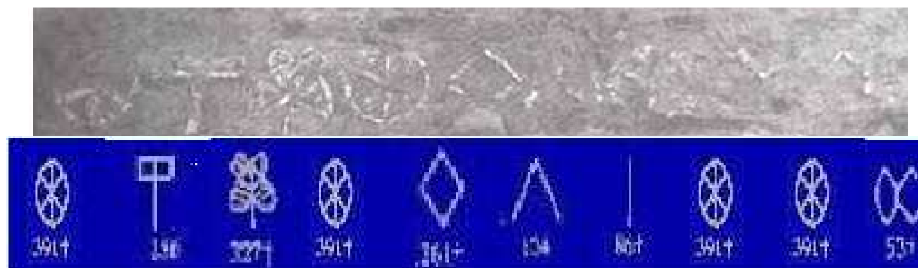
http://www.scribd.com/doc/2275868/dholaviraepigraphs

Reading Dholavira sign board and Dholavira seals with Sarasvati hieroglyphs



Variants:





Ten glyphs constitute the inscription found near the western chamber of the northern gate of the citadel high mound; each sign is 37 cm. high and 25 to 27 cm. wide and made of pieces of white crystalline rock or gypsum. The glyphs were mounted on a big wooden board c. 3 metres long. The board might have been mounted atop the citadel-gate of the fortified Dholavira. (Bisht, R.S., 1991, Dholavira: a new horizon of the Indus Civilization. *Puratattva*, Bulletin of Indian Archaeological Society, 20: 81; now also Parpola 1994: 113).

The impressively large sign-board should have been visible to mleccha mariners navigating through the Gulf of Kutch, the Persian Gulf and around Sauraashtra coastline.

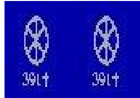
Sign 391 occurs four times on this inscription. The glyph, Sign 391, connotes the ‘nave of wheel’. It also occurs in a duplicated pair.

The 'nave of spoked wheel' sign seems to be the divider of the three-part message. Hence, the message on the sign-board can be read in 3 sets as follows.

Set 1:

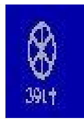


Rebus: kangar ‘portable gold furnace’ (glyph: crab ‘kakr.a_)



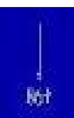
: **erako** ‘nave’; **san:gala** ‘pair’ Rebus: **erako san:gad.a** = furnace for any metal infusion. Vikalpa: Rebus: bar.ea ‘merchant’ (glyph: pair, ‘barea’)

Set 2:

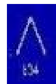




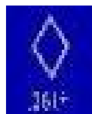
era, erako ‘nave of wheel’; erako_lu the iron axle of a carriage (Ka.) rebus: eraka, er-aka any metal infusion (Ka.Tu.)



med.h ‘merchant’; med. ‘iron’ (met ‘one’) Vikalpa: kod.a ‘four cowdies make one’; rebus: kod. ‘workshop’



ad.aren, d.aren ‘lid’ (ligatured atop ‘fish’); rebus: **aduru** ‘native metal’



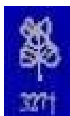
kancu ‘bronze’ (Te.) [kanac ‘corner’ (Santali)]

If the sixth sign from left is an X, it can be read: da_t.u ‘cross’; rebus: datu ‘minerals.

Set 3 (three glyphs): copper, metal workshop

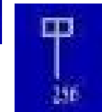


eraka ‘furnaced copper’ (eraka ‘nave of wheel’)



loh ‘(copper) metal’ (Fig leaf ‘loa’); vikalpa: kamar.kom ‘ficus’; rebus: kampat.t.am ‘mint’

Peg



‘khun.t.a’; rebus: ku_t.a ‘workshop’

The message on Dholavira signboard can be explained using mleccha lexemes from Set 3 to Set 1:

Mint, workshop for copper metal infusion ; bronze-native-metal workshop (smithy); merchant (with) furnace for any metal infusion and portable gold furnace.

Kampat.t.am eraka ku_t.a; bar.ea kancu med. aduru eraka; sangad.a eraka kangar

Perhaps, the earliest advertisement hoarding on a smithy/mint of Dholavira inviting mariners to the metallurgical innovations of Sarasvati civilization.

Reading hieroglyphs found principally on Sarasvati River Basin sites

Sarasvati inscriptions found from the following sites are presented: Bet Dwaraka, Dholavira, Banawali, Rupar, Kunal, Rakhigarhi, Kalibangan, Chandigarh, Ganweriwala



Kalibangan089A14c 8101This is a sealing with the impressions of four distinct seals or tablets.



In Lines 1, 2 and 3 there are unique sign glyphs which are paired with the glyph 'two short linear strokes'. This glyph is read: badhi 'slice'; rebus: badhi 'worker in iron and wood' (that is, artisan). Thus, this glyph is qualified by three glyphs on lines 1,2 and 3 respectively as follows:

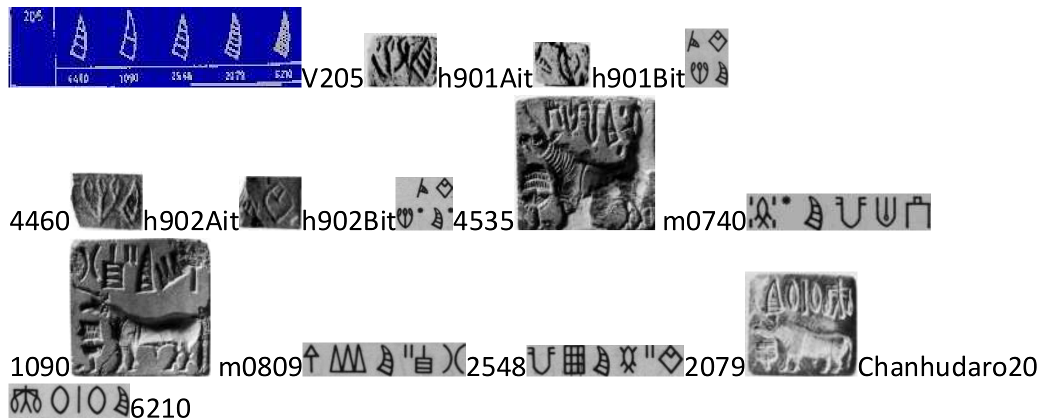
The paired glyphs are read as: sal + badhi = workshop + artisan; eraka + badhi = copper + artisan; ranku + badhi = tin + artisan.

A ligatured glyph which recurs on Line 2 and on Line 4: **d.abu** 'an iron spoon' (Santali) ligatured with mer.go 'pot'; rebus: d.ha_ba_ 'workshop'; med. 'iron'.

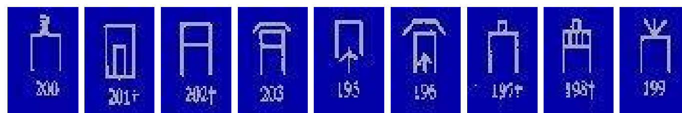
One line 4: 'Person' glyph is ligatured to a rimless, wide-mouthed pot: mer.go 'pot'; rebus: med. 'iron'; mandi 'person'; manda_ 'warehouse'.

Line 4: 'tusk' glyph: Glyph: *son.d.* 'tusk of boar' (Santali) Rebus: *sund* 'pit (furnace)'; *sum, sumbh* a mine, a pit, the opening into a mine, the shaft of a mine; sum bhugak the entrance to a mine, pit's mouth (Santali). s*un.d.i* a semi-hinduised aboriginal caste; this caste are the distillers and liquor sellers; *sun.d.i gadi* a liquor shop

(Santali) *cun.d.* to boil away (Ko.); *sun.d.u* to evaporate (Ka.); *cun.d.u* to be evaporated or dried up (Te.); *s'un.t.hi* to become dry (Skt.)(DED 2662).

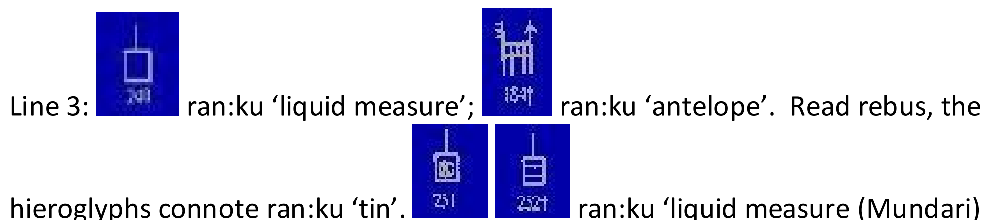


Line 1:

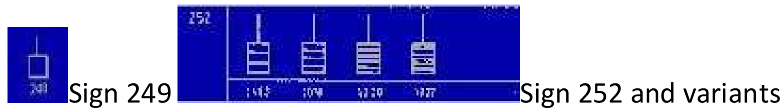


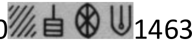
<salu>(B) {N} ``^space in front of the door of a house''. @B25170. #33661. Rebus: sala 'workshop' (Santali)

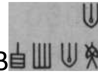
Vikalpa: **med.** iron (Ho.); *me~rhe~t* 'iron' (Santali)
Glyph: platform: *man.d.hwa, man.d.ua, man.d.wa* 'a temporary shed or booth erected on the occasion of a marriage'; *man.d.om* 'a raised platform or scaffold'; *ma~r.om* 'a platform, used to keep straw on, or from which to watch crops' (Santali) *man.ai* low wooden seat, low earthen dais, wooden base of cutting instyruments, footstool (Ta.); *man.i, man.e* stool, low bench, seat (Ka.); *man.e* low stool to sit upon (Tu.)(DEDR 4675). Rebus: **man.d.a_** = warehouse, workshop (Kon.lex.) *man.n.u* to do, perform, adorn, decorate, polish (Ta.); *man.ai* to create, fashion (Ta.); *manayuka, maniyuka* to fashion, form earthenware, make as a potter (Ma.)(DEDR 4685). *man.i* jewel of office (Skt.); *man.iyam* office of the village headman (Ta.); superintendence of temples, palaces, villages (Ma.); *man.e.v, man.ye.v* the office of monegar (Ko.); *man.iya, man.iha, man.eya, man.e* superintendence of temples, maths, palaces, custom-houses (Ka.); *man.iga_re* revenue inspector (Tu.); *man.iyamu* office or duties of the manager of a temple (Te.)(DEDR 4674).
Line 2: era, eraka 'nave of wheel'; ara_ 'spokes'; rebus: araka 'copper'; ara 'copper' (Akkadian)

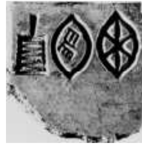
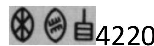


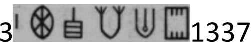
Line 3: ran:ku 'liquid measure'; ran:ku 'antelope'. Read rebus, the hieroglyphs connote ran:ku 'tin'. ran:ku 'liquid measure (Mundari)

Sign 249 Sign 252 and variants

 m12901463

 m1203A  m1203B1018

h558 4220

m11031337

Ganweriwala. Surface find on a mound (2007). A terracotta from Ganweriwala discovered in 2007, shows a "kneeling human" and a person similar to one shown perched on a tree-branch or a person seated in a yogic posture on a platform with an arch atop the scene. Sequence of three sign glyphs.

Hieroglyphs on one side: Gummat.a, kummat.a 'arch, canopy, roof' (Te.Ta.H.); rebus: kumpat.i 'chafing dish' (Te.) kamad.ha 'penance' (Pkt.); rebus, kampat.t.am 'mint' (Ta.); ko_lemmu 'backbone' (Te.); rebus, kolimi 'furnace' (Te.)

Vikalpa:

The dome over the pictographs may connote 'crookedness' as also the sign 3 in the sing sequence of glyphs: comb, rim-of-jar, bracket ; if so: **kut.ila** = bent, crooked (Skt.) kut.ila (Skt. Rasaratna samuccaya, 5.205) Humpbacked kud.illa (Pkt.) **( )** The glyph of a curved line when mirrored becomes a ligature, an enclosure to other glyphs. Rebus: **kut.ila, katthi_l** = bronze (8 parts copper and 2 parts tin) [cf. a_ra-ku_t.a, 'brass' (Skt.)]

Banawali19 The sign glyph next to rim-of-jar glyph (kan.d. kan-ka 'mine-worker furnace') may be a stylized combination of two brackets, that is, two crooked or bent lines (kut.ila 'bronze'); the pairing or two may be barea 'two'; rebus: barea 'merchant'..

kamad.ha 'penance'; rebus: kampat.t.am 'mint'
man.d.i 'kneeling'; rebus: **man.d.a_** = workshop (Kon.)
kut.ila 'bent'; rebus: kut.ila 'bronze: 8 parts copper, 2 parts tin'.

Dholavira: Seals (Courtesy ASI)

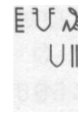


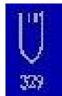
Glyptic elements in the compositions:

er-aka 'upraised arm' (Te.) rebus: eraka, era 'copper' (Ka.).
mandi 'person'; rebus: man.d.a_ 'warehouse' (Konkani)
khan:gar 'full of holes'; rebus: kan:gar 'furnace'
mr..eka 'antelope'; rebus: milakkhu 'copper'
bali_varda 'bull'; rebus: bali 'iron sand ore'
damr.a 'heifer; rebus: tam(b)ra 'copper'

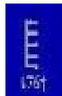
Bet Dwaraka 1 looking down  S'ankha seal. One-horned bull, short-horned bull and an antelope looking backward.

The epigraph on the first line of Text 4575 recurs on many of the inscriptions shown on seals in this monograph.

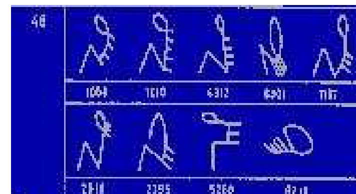
 h352A  h352B  h352C  4575 Pict-120: One or more dotted circles. Field Symbol 83 (Dotted circles) 57 out of 67 occur at Harappa. Vikalpa: pa_so 'die' (orthography: dotted circle). Rebus: pa_s'o = a silver ingot; pa_s'a_ta_n.iyo = one who draws silver into a wire (G.) pa_slo = a nugget of gold or silver having the form of a die (G.)

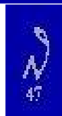
 mer.go = rimless vessels (Santali) Rebus: med. iron, iron implements (Ho).

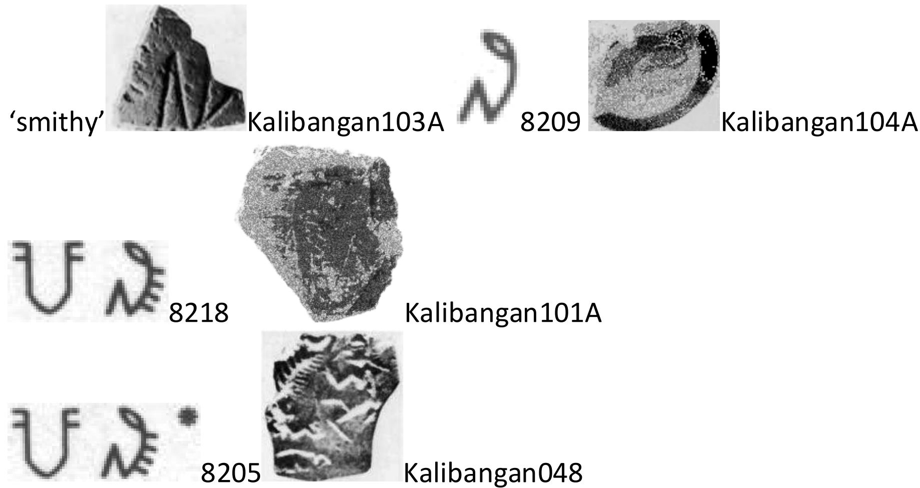
Kolmo 'three' (glyph: three numeral strokes); rebus: kolami 'forge'

 **Sign glyph: bar.ae**-bur.ui = to oil and comb someone's hair; rebus: ba~r.ia~ = merchant; bar.ae = blacksmith

 kand. kan-ka 'rim of jar'; rebus: kand. 'fire-altar, furnace'; khanaka 'mine-worker'.



 panjara 'ribs, rib-cage'; rebus: pasra


'smithy' Kalibangan103A 8209 Kalibangan104A

8218 Kalibangan101A

8205 Kalibangan048

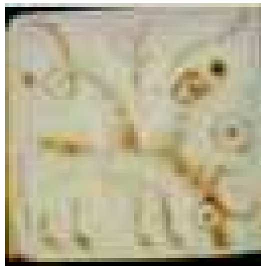
panjaramu = the body; skeleton (Te.lex.) panjara = skeleton, ribs (MBh.)(CDIAL 7685). **panjar** = a rib, the part of the body in which the ribs are; ibil panjar = the fifth rib; panjri = a rib, ribs; gad.i panjri = the cross bars uniting the shafts (hudar.) of a cart (Santali.lex.) cf. paks.a = wing, feather, fin, shoulder, side (RV)(CDIAL 7627) panjarao (Skt. panjari_, rib; Sad. panjraek) = a poke in the ribs with a stick (Mundari.lex.) pa_njarum = a frame; a skeleton; pa_kha = a side (G.lex*.) pajhrao, pajhr.ao* = to become lean, to lose flesh (Santali.lex.) **pa_msal.i_, pa_msal.um, pa_sum** = a rib; **pa_s'ali_** = a rib (G.)

bar.ae-bur.ui = to oil and comb someone's hair (Mundari.lex.) va_raki_ra = a small comb (Skt.); va_ruka = to comb (Ma.); va_r = to comb as hair (Ta.); ba_can.ige = a comb (Ka.); ba_grka_ wooden comb worn by boys and girls (Kur.)(DEDR 5357). **ba_ran.e**, ba_rane, ba_rpan.i = a comb; ba_runi = to comb the hair (Tu.lex.) Rebus: bar.ae 'blacksmith' (Santali) Rebus: **bhoron** = a mixture of brass and bell metal (Santali.lex.) bhart-i_ya_ = a barzier, worker in metal; **bhat.a, bhra_s.t.ra** = oven, furnace; bari_ = blacksmith (G.) **barad., barhat.** = rough; not hard; brittle (G.lex.) **bharata** = casting metals in molds; bha_ravum = to keep live coals, buried in the ashes (G.lex.) **bharata** = fire in which the rice for bra_haman-s is boiled; name of Rudra (the Maruts are called his sons: RV 2.36.8); name of an A_ditya: Nir. 8.13); name of Agni (kept alive by the care of men)(RV); of a particular Agni (father of Bharata and Bharati_)(MBh.); a priest (r.tvij: Naigh. 3.18)(Skt.lex.) bharta = a method of cooking fish, mushrooms and vegetables by wrapping up in leaves and roasting in ashes (Santali.lex.) **bara_t.a** = a kind of firework (Tu.lex.) bharta = bake in live coals (Santali); bharta (Desi)(Santali.lex.) **bharan.yu** = fire (Skt.lex.) Vikalpa rebus: ba~r.ia~ = merchant; bar.ae = blacksmith (Santali.lex.)



Vikalpa: kan:kata = comb (Te.) Rebus: kan:gar = portable furnace (K.)

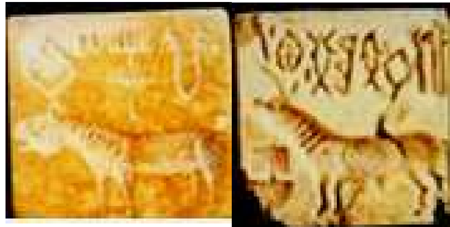
Dholavira 3. A person with uplifted arm near a composite animal: bull, heifer, antelope heads on a bovine body with rings on neck. Dotted circles on the three heads of animals.



Dholavira 4. Composite animal: bull, heifer, antílope heads on a bovine body. A dotted circle and a rice-plant. The faces of the three animal heads are shown with dotted circles.



Dholavira 5. Heifer, standard device and 5 sign glyphs.





Dholavira 6. Tiger and 4 sign glyphs.

Dholavira 7. Heifer, one-horn, rings on neck, standard device and 7 sign glyphs





Dholavira1a 9121 Dholavira 2a



Rupar1A



Rupar1B



9021

kun.t.e, **khu~t.i**, 'harrow, stake'; rebus: **kut.hi**, 'furnace'

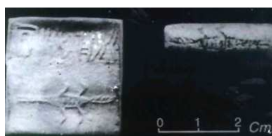


m1181Acolour 2222 Pict-80: Three-faced, horned person (with a three-leaved pipal branch on the crown), wearing bangles and armlets and seated on a hoofed platform





Padri . Head painted on storage jar from Padri, Gujarat (c. 2800 BCE). Details of body with multiple hands (?) Similar horned-heads painted on jars are found at Kot Diji, Burzhom and Kunal (c. 3rd millennium BCE). [Source: Page 21, Figs. 10A and B in: Deo Prakash Sharma, 2000, *Harappan seals, sealings and copper tablets*, Delhi, National Museum].



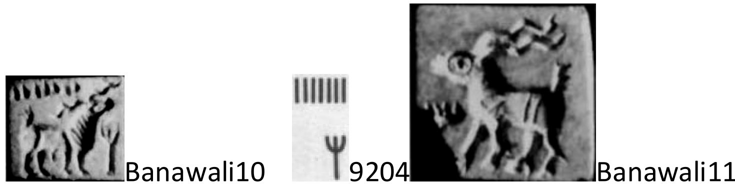
Rakhigarhi: Cylinder Seal (ASI), Lizard or gharial?

min.d.a = naligan.d.lapa_mu, nalikiri, naliki_cu = the greenish house lizard with a scarlet tail (Te.lex.) [Note the glyph of lizard (or alligator?) dominating a group of animals on tablets in bas relief]

Rebus: **med.** iron, iron implements (Ho.) *me~rhe~t* 'iron'; *me~rhe~t icena* 'the iron is rusty'; *ispat me~rhe~t* 'steel', *dul me~rhe~t* 'cast iron'; *me~rhe~t khan.d.a* 'iron implements' (Santali) (Santali.lex.Bodding)

Vikalpa:

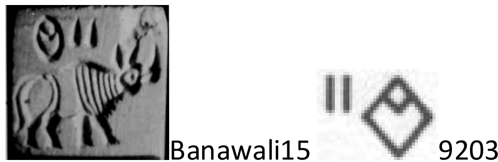
kudur d.okka = a kind of lizard (Pa.); kudur d.okke, kudur d.ekke = garden lizard; kidri d.okke house lizard (Go.)(DEDR 1712). Rebus: **kuduru =** a goldsmith's portable furnace; **kudul.l.u** (pl.) (Te.lex.) *kudru* top of fireplace (Kuwi)(DEDR 1709).


Banawali10 9204 Banawali11


Banawali12 Banawali13a

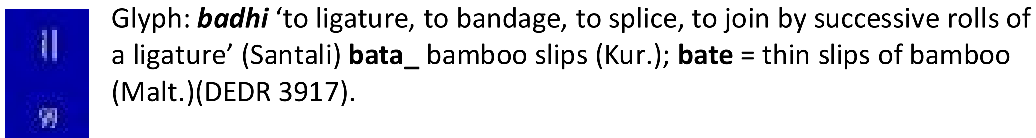
kolmo 'three'; kolmo 'rice-plant'; rebus: kolami 'forge'
mr..eka 'goat'; rebus: milakkhu 'copper'
bat.a 'six'; rebus: bat.a 'smelter furnace'
xola_ 'tail'; rebus: kol 'pancaloha, alloy of five metals'


Banawali14 Banawali1

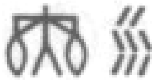

Banawali15 9203

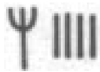
kanac 'corner'; rebus: *kan~cu* 'bronze'

Glyph: badhia = castrated boar, a hog; **bhator. sukri** = a huge wild boar with large tusks; rata sukri = a boar in hunting parlance; sukri kud.u = a boar; datela sukri = a wide boar (Santali.lex.)

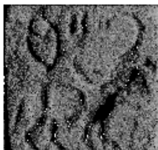

Glyph: ***badhi*** 'to ligature, to bandage, to splice, to join by successive rolls of a ligature' (Santali) **bata_** bamboo slips (Kur.); **bate** = thin slips of bamboo (Malt.)(DEDR 3917).

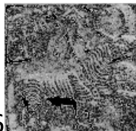
Rebus: bad.hi 'worker in iron and wood' (Santali) bar.ae = a blacksmith; bar.ae kudlam = a country made hoe, in contrast to cala_ni kudlam, an imported hoe; bar.ae mer.ed – country smelted iron; bar.ae muruk = the energy of a blacksmith (Mundari.lex.) bar.ae = bad.ae (Santali.lex.) bari_ = blacksmith, artisan (Ash.)(CDIAL 9464). The occurrence of bari_ in Ash. (CDIAL 9464) and bar.ae in Mundari and of vardhaka in Skt. point to the early phonetic form: bard.a; semantic: worker in iron and wood, artisan. Thus, it is suggested that the depiction of the backbone, barad.o is rebus for bard.a, artisan. barduga = a man of acquirements, a proficient man (Ka.)

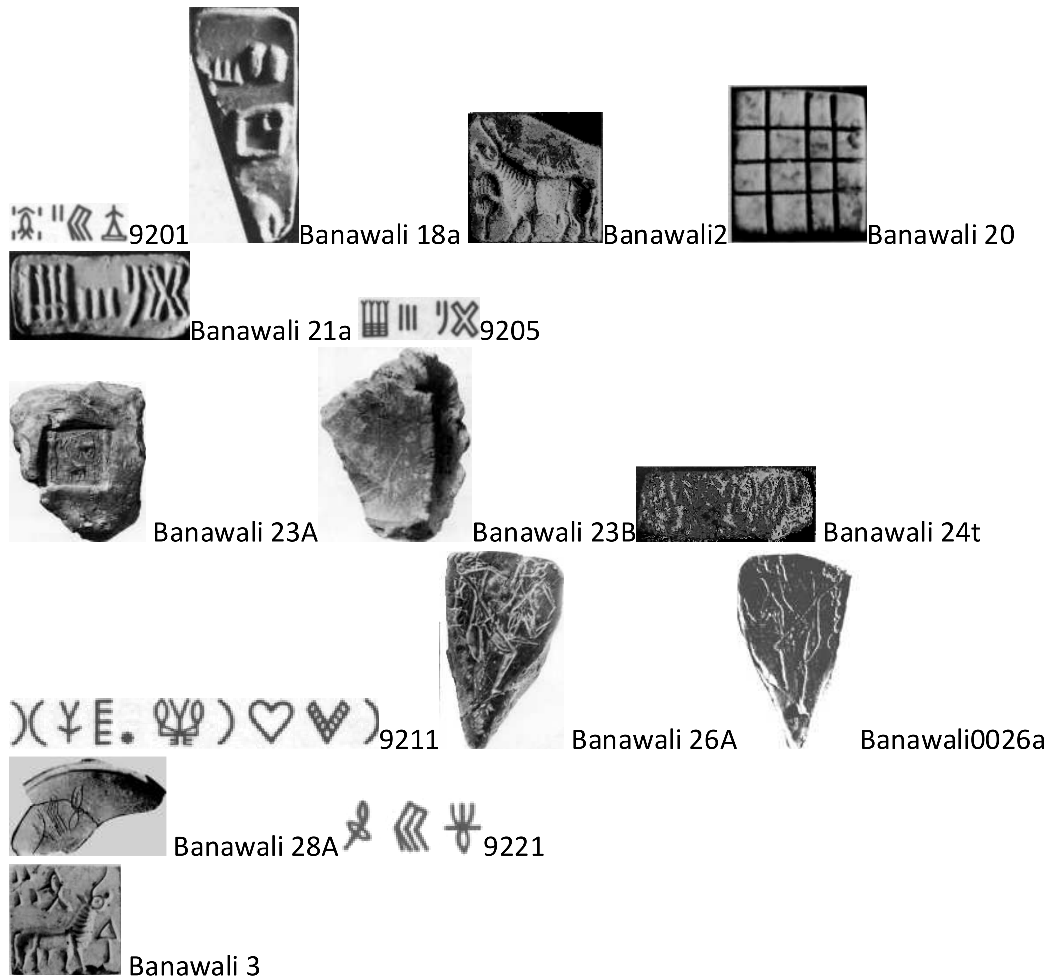
Kalibangan049 8013 heraka 'spy'; rebus: eraka 'copper'; kol 'tiger'; rebus: kol 'pancaloha, alloy of 5 metals'; krammara 'looking back'; kamar 'smith'; kut.i 'woman water-carrier'; rebus: kut.hi 'smelter furnace'. Bat.a 'six'; rebus: bat.hi 'smelter furnace'; two short strokes, badhi; rebus: badhi 'worker in iron and wood'.

Kalibangan050c 8031 Pict-53: Composition: body of a tiger, a human body with bangles on arm, a pig-tail, horns of an antelope crowned by a twig.
pon, ponea 'four'; rebus: pon 'gold'
kolmo 'rice plant'; kolami 'forge'
kola 'woman, wife' (Nahali); kol 'pancaloha, alloy of 5 metals'
ad.aru twig; ad.iri small and thin branch of a tree*; ad.ari* small branches (Ka.); *ad.aru* twig (Tu.)(DEDR 67). Rebus: aduru 'native metal' (Ka.)
d.abe, d.abea wide horns; Rebus: *d.ab, d.himba, d.hompo* 'lump (ingot?)' (Santali)

The homonyms may also explain the following epigraphs:

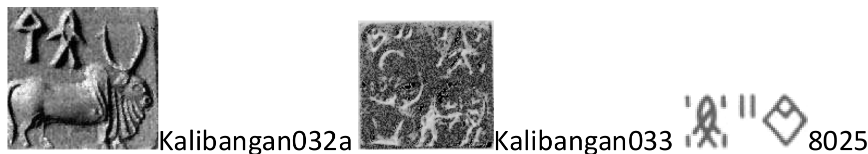
 Banawali 5 9203 Banawali 6
 Banawali 7 Banawali 8 Banawali 9C
Kalibangan027  8022 'Unicorn' with two horns! "Bull with two long horns (otherwise resembling the 'unicorn')", generally facing the standard. That it is the typical 'one-horned bull' is surmised from two ligatures: the pannier on the shoulder and the ring on the neck.

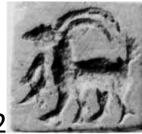
Banawali16Banawali 17


9201 Banawali 18a Banawali2 Banawali 20
Banawali 21a 9205
Banawali 23A Banawali 23B Banawali 24t
9211 Banawali 26A Banawali0026a
Banawali 28A 9221
Banawali 3

bed.a hako (ayo) 'fish'; badhor. 'fish with bones' (Santali) badhor 'cross-grained' (Santali) Rebus: bed.a 'hearth' (G.)

Glyph: *dol* 'the shaft of an arrow, an arrow' (Santali) Rebus: **d.ha_l.ako** = a large metal ingot; d.ha_l.aki_ = a metal heated and poured into a mould; a solid piece of metal; an ingot (G.) d.ha_l.avum = to fuse; to melt; to cast (a metal)(G.) *dul* 'to cast metal in a mould' (Santali) *d.ha_l.u* cast, mould; way, style (Ka.); d.ha_l.a (M.); d.a_l.a lustre, radiance; beauty, loveliness, gracefulness (Ka.); d.ha_l.a (M.); d.a_lu, d.a_l.u, da_l.u (Te.)(Ka.lex.) d.ha_lan. to melt, to mould, to form, to figure, to shape, to coin; d.hala_i_, d.hala_un. the price of casting, pouring, melting; d.halna_, d.halja_n.a_ to be cast, to be poured out (as wine into a cup); d.halwa_i_ pouring out, melting; the price of pouring out, melting out (P.lex.) Vikalpa: **s'al** (arrow); **s'al** (workshop). *kan.t.am* 'arrow' (Ta.) rebus: kan.d. 'furnace'

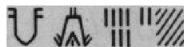

Kalibangan032a Kalibangan033 8025

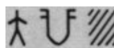
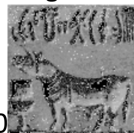
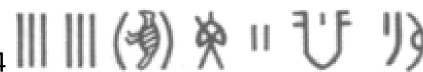
Kalibangan034  8052Kalibangan037 8042

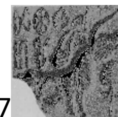
 Banawali 30

 Banawali 4

era_ = claws of an animal that can do no harm (G.) Rebus: era, eraka 'copper'
kolmo 'rice-plant'; rebus: kolami 'forge'
kand. kan-ka 'rim of jar'; rebus: kand. 'fire-altar, furnace'; kanakha 'mine-worker'.

 Kalibangan002  8019 Kalibangan003

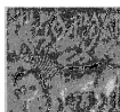
8030 Kalibangan004 8026

Kalibangan005 8017

Kalibangan006  8020Kalibangan007

8043

Kalibangan008 8041Kalibangan009

8021Kalibangan010



8006 Kalibangan011

8034 Kalibangan012

Kalibangan013 8051 Kalibangan014

8012 Kalibangan015 8056

Kalibangan016 8044

Top line epigraph: eraka ‘nave of wheel’; ara_ ‘spokes’; Rebus: era, eraka ‘copper’; ara ‘copper’ (Akkadian); arka ‘copper’ (Ka.)
badhi ‘bandage’; badhi ‘worker in iron and wood’

Bottom line epigraph: badhor., bed.a hako ‘fish’; rebus: bed.a ‘both sides of a hearth’
kan.d. kan-ka ‘rim of jar’; rebus: kand. ‘fire-altar, furance’; kanakha ‘mine-worker’
mandi ‘person’; rebus: manda_ ‘warehouse’. [The one-horned heifer with pannier and standard device in front has been explained elsewhere: coppersmith workshop, military guard accompanying treasure.]



Kalibangan017 8027

era ‘claws of crab’; era, eraka ‘copper’; barea ‘two’; bar.ea ‘merchant’; kan.d kan-ka ‘rim of jar’; rebus: Kano. ‘fire-altar, furance’; kanakha ‘mine-worker’

Kalibangan018 8040 Kalibangan019

8058 Kalibangan021 Kalibangan022

8008 Kalibangan023

8029 Kalibangan024

Kalibangan025 8037



Kalibangan026 8071

Sign glyph in front of one-horned heifer (replaces the standard device): kand. kan-ka 'rim of jar'; rebus: kan.d. 'fire-altar, furnace'; khanaka 'mine-worker'.

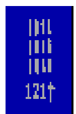
Sign glyph, ficus: loa 'ficus'; rebus: lo, loha 'metal'. The one-horned heifer with pannier is damr.a (tambra 'copper') kamarsala 'smith workshop'; that is, coppersmith workshop.

Kalibangan053 ku_t.amu = summit of a mountain (Te.lex.) Rebus: **ku_t.akamu** = mixture (Te.lex.) loa 'ficus'; rebus: lo, loha 'metal'; hence, metal alloy as in a_raku_t.a 'brass'.

Kalibangan028 8038Kalibangan029

8018

Kalibangan030 8002

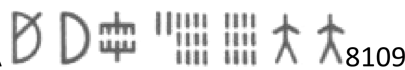
bed.a = twelve (pies)(Te.) Rebus: bed.a 'hearth'. kut.ila 'bent'; rebus: kut.ila 'bronze'. Vikalpa: co~ga_ 'two handbreadths' (IL 3121) co~ga_ stick used as a measure of two handbreadths (M.); s'an:ku a measure of twelve fingers; a measuring rod (Skt.). Rebus: co~ga_, co~gi_ pipe of smith's bellows (Mth.); con:ga a bamboo tube (Santali)



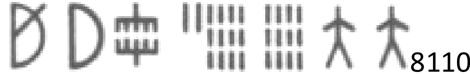
See three linear strokes as part of the epigraph (left-most glyph) on Seal 145. A square steatite unicorn seal with a unique inscription was found in the street debris on the inside of the city wall. The two sets of signs on the right hand side of the seal would appear in reverse, i.e. be on the left, when it was pressed into clay. Harappan Period, c. 2300 BC. kut.i 'water carrier'; rebus: kut.hi 'smelter furnace'; ligature element: rim of jar 'kand. kan-ka'; rebus: kan.d 'fire-altar, furnace'; khanaka 'mine-worker'. kolmo 'three'; rebus: kolami 'forge'.

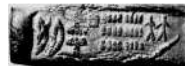
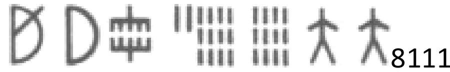
Pairing of human forms in the following: mandi 'person'; sangad.a 'two'; sangad.a 'furnace'. (Glyph of two short linear strokes): badhi 'slice'; rebus: badhi 'worker in iron and wood'

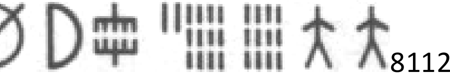

V305 **ka_mat.hum** [Skt. kamat.ha a bamboo] a bow (G.lex.) kamat.ha = bamboo; kambi = shoot of bamboo; karmuka = bow (Mn.); kamad.ha, kamad.haya = bamboo (Pkt.); ko_ro = bamboo poles (Bhoj.); ka_mro bamboo, lath, pieces of wood (N.); **ka_mvari** bamboo pole with slings at each end for carrying things (OAw.); ka~_war, ka_war., ka_war., ka_war (H.); ka_var. (G.); ka_vad. (M.); ka_vad.ia, kavva_d.ia one who carries a yoke (Pkt.); ka~_war.i_, **ka~_war.iya_** (H.); ka_var.iyo (G.); ka_va_t.hi_ carrying pole (S.); **ka_va_t.hyo** the man who carries it (S.); ka_mar.a_, ka_mur.a_ rafters of a thatched house (Or.); ka_mr.u~ chip of bamboo; ka_mar.-kot.iyu~ = bamboo hut (G.); ka_m.t.ha_ bow (B.); ka_mt.hu~ (G.); kamt.ha_, kamt.a_ bow of bamboo or horn (M.); ka_mt.hiyo archer (G.); kaba_ri flat piece of bamboo used in smoothing an earthen image (A.); ka~_bi_t., **ka~_bat.,** ka_~bt.i_, ka_mat., ka_mt.i_, ka_mt.hi_, ka_ma_t.hi_ split piece of bamboo etc., lath (M.)(CDIAL 2760). Rebus: kampat.t.am 'mint' (Ta.)

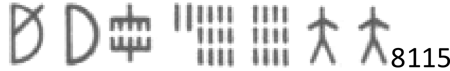

Kalibangan069A 8109

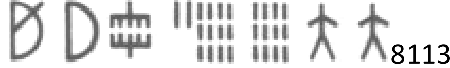

Kalibangan070A 8108

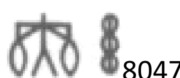
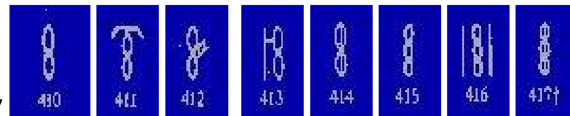

Kalibangan071 8110


Kalibangan072 8111


Kalibangan073 8112


Kalibangan074 8115

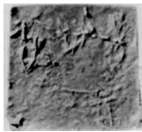

Kalibangan075 8113


Kalibangan020 8047 

kad.i_ a chain; a hook; a link (G.); kad.um a bracelet, a ring (G.) [Note the orthography of rings shown on the neck of the one-horned young bull.] rebus: kha_d. 'trench fire-pit' or kad.iyo 'brick-layer'. kad.iyo [Hem. Des. kad.a i o = Skt. sthapati a mason] a bricklayer; a mason; kad.iyan.a, kad.iyen.a a woman of the bricklayer caste; a wife of a bricklayer (G.) ka_t.i = fireplace in the form of a long ditch (Ta.Skt.Vedic) ka_t.ya = being in a hole (VS. XVI.37); ka_t.a hole, depth (RV. i. 106.6) kha_d. a ditch, a trench; kha_d.o khaiyo several pits and ditches (G.) *khan.d.run:* 'pit (furnace)' (Santali) Vikalpa: one-horned heifer may also be read as: khad.a_i_ a heifer (used in the Sorat.h Pra_nt)(G.) kat.ra_ bull calf; kat.hr.a_ young

buffalo bull; kat.iya_ buffalo heifer (H.); kat.r.a buffalo calf (WPah.); kat.ai buffalo calf (Gaw.); kat.r.a_ young buffalo (P.)(CDIAL 245).

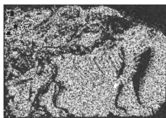
bali_varda, ba-il 'bull'; rebus: bali 'iron sand ore'.
d.hangar 'feeding trough' ; d.hangar 'smith'.

Kalibangan031a 8007 Kalibangan035

Kalibangan036

Kalibangan038Kalibangan039 8011

Kalibangan0408072

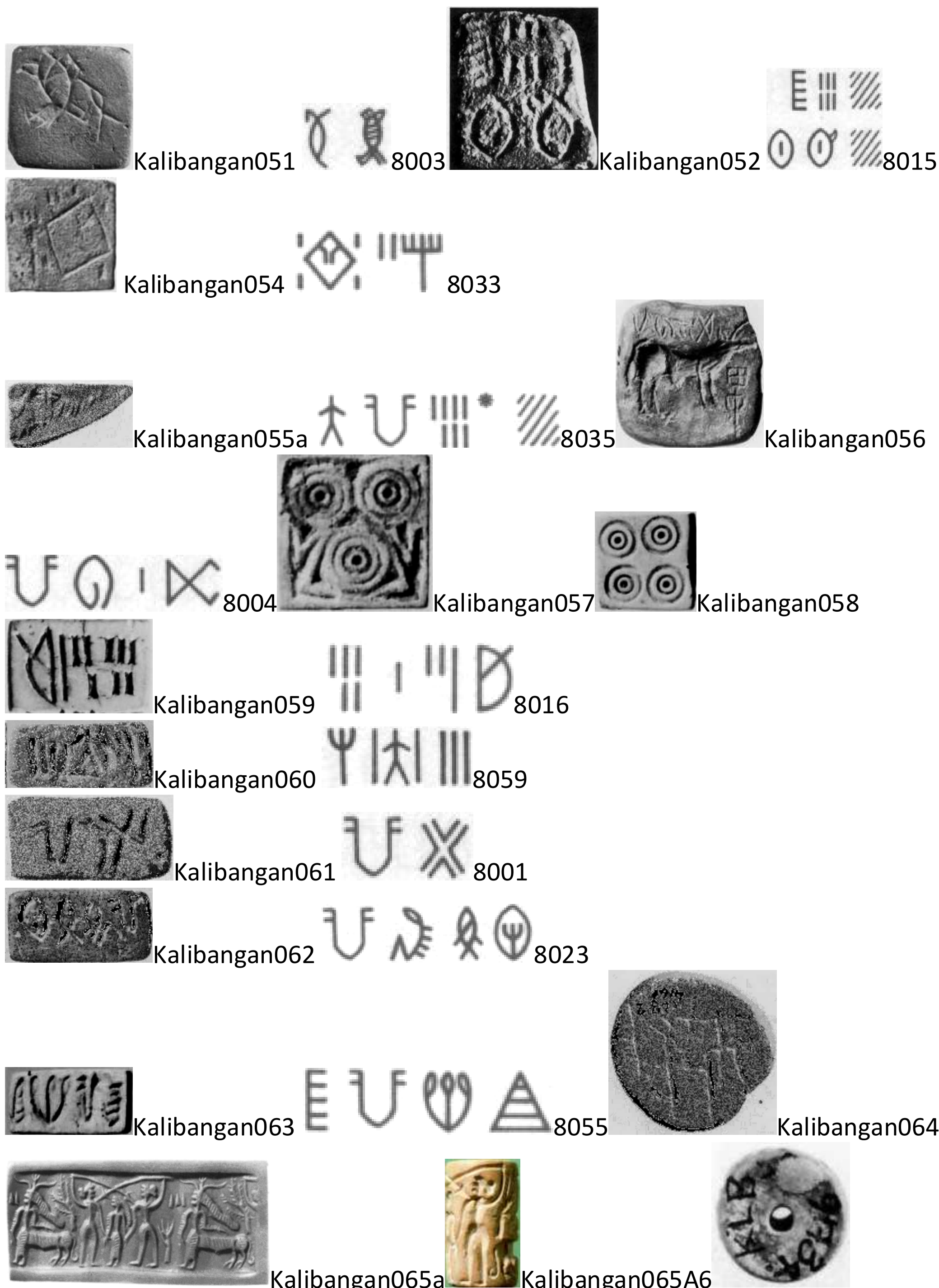
Kalibangan041Kalibangan042a

Kalibangan043 8039 Pict-59:Composite motif: body of an ox and three heads: of a one-horned bull (looking forward), of antelope (looking backward), and of short-horned bull (bison) (looking downward).

Kalibangan044 8045

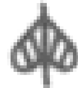
Kalibangan045 8054

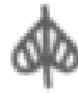
Kalibangan0468053Kalibangan047

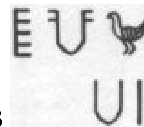


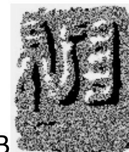
Kalibangan065E 8024 Pict-104: Composition: A tree; a person with a composite body of a human (female?) in the upper half and body of a tiger in the lower half, having horns, and a trident-like head-dress, facing a group of three persons consisting of a woman (?) in the middle flanked by two men on either side throwing a spear at each other (fencing?) over her head.

Kalibangan066  8102



Kalibangan067  8121 Ox-antelope with a long tail; sometimes with a trough in front.

Kalibangan068A  Kalibangan068B 8117 [Is it a bird or an India River Otter? Could be a scorpion, a model for Signs 51 and 52 ?  See variant in Text 9845 West Asia find]  ko_d.el bandicoot (Pa.) [**kod.el** = rat (Go.)]   Rebus: kole.l 'smithy, temple'

Kalibangan076A  Kalibangan076B 

Kalibangan077A  Kalibangan077B 

8118 

Kalibangan078A Kalibangan078B



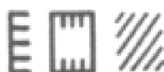
8104 Kalibangan079AB Kalibangan080A

 8120 Kalibangan081A

8105

Kalibangan082A 8122

Kalibangan083A12Kalibangan084A12

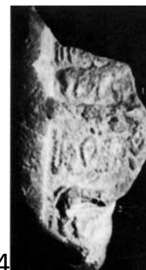
Kalibangan084A2 8103



Kalibangan085A12Kalibangan085B 8106



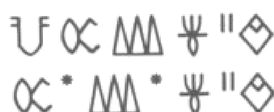


Kalibangan086A14 8114



Kalibangan087A12 8116

Kalibangan



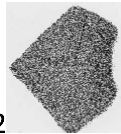


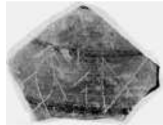
088A14Kalibangan088B 8119

Kalibangan090AKalibangan090A1

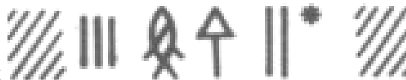
Kalibangan090A2

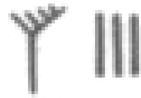
8202 Kalibangan091A

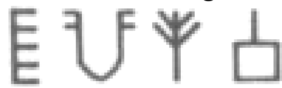
8212 Kalibangan092A 8210

Kalibangan093A 8219

Kalibangan094A Kalibangan095A

Kalibangan096c 8221

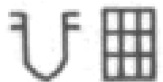
Kalibangan097A 8213 Kalibangan098A

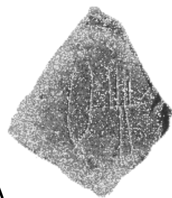
8201

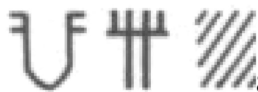
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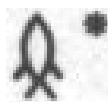
Kalibangan100A Kalibangan102A 8207

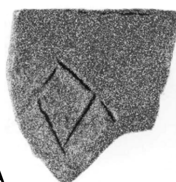
Kalibangan105A 8216 Kalibangan106A

8204

 Kalibangan107A  Kalibangan108A

8206

 Kalibangan109A  Kalibangan110A  8211

 Kalibangan111A  Kalibangan112A Kalibangan118

 Kalibangan119A  Kalibangan119B

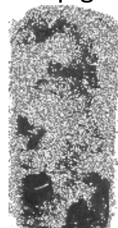
Kalibangan120A 8220  Kalibangan122B



Kalibangan122B2

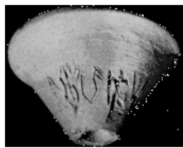
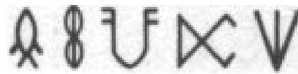


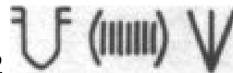
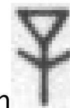
Kalibangan121A, B 8302 Bottom line: kut.ila 'bent, crooked'; rebus: kut.hila 'bronze'; barea 'two'; bar.ea 'merchant'. Top line: kanoc 'corner'; kancu 'bronze'; badhi 'slice'; rebus: badhi 'worker in iron and wood'; badhor., bed.a hako 'fish'; rebus: bed.a 'hearth'; kan.d. kan-ka 'rim of jar'; rebus: Kano. 'fire-altar, furnace'; khanaka 'mine-worker'; mandi 'person'; manda_ 'warehouse'. Thus, a list of possessions and competence of the artisan are recorded as epigraphs – by the metlsmith -- on the metal rods.

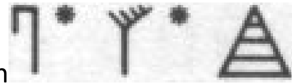
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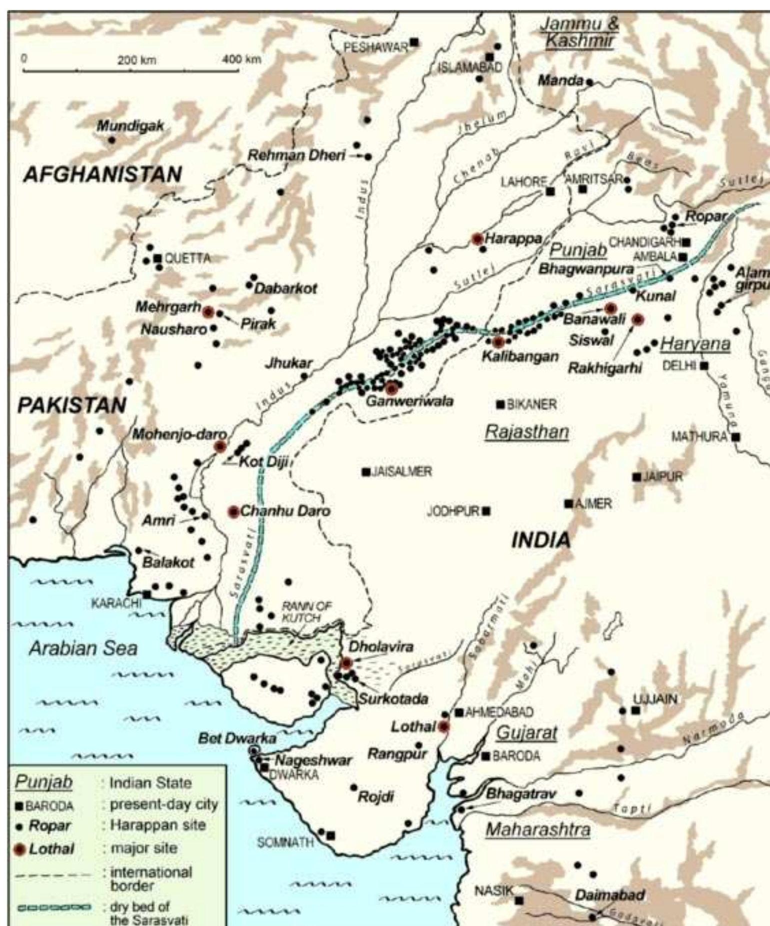
8301

 Chandigarh01  9101

Chandigarh02  9102 Chandigarh 
9103

Chandigarh  9104

Notes on archaeological sites on Sarasvati river basin



Many sites such as Lakhmirwala, Gurnikalan, Bhatinda remain unexcavated. These large sites (some of which twice as large as Mohenjodaro or Harappa which are about 100 ha), together with other sites such Kalibangan, Rupar (spelt also as Ropar or Rupanagara), Kunal, Banawali, Rakhigarhi (another large site in Hissar, 224 ha) will unravel the chronological, natural history of River Sarasvati and her tributaries. Excavations are also likely to establish the possibility of identifying Vedic people, archaeologically. Some indications have come from another large site, Ganweriwala (now in Pakistan, Cholistan region).
Source: fi.wikipedia.org
Rakhigarhi (Hissar district) 29.17N - 76.07E
Today, the 5000 year old history of our civilization is on the threshold of being rewritten. Recent excavations at Rakhi Garhi in Hissar district of Haryana may push the history of the civilization back by over a thousand years. This site could again bring to front, questions about the Vedic Civilization and its relationship to the Indus Valley civilization. Archaeologists and historians are already excited about the

findings from Rakhigarhi - a large site on the banks of, what is now believed to be, the dried bed of Saraswati river. Senior archaeologists consider this to be no ordinary Harappan site. They say the findings have already started showing new civilization contours.



Rakhigarhi is about to rewrite the 5000 year old history of our civilization. Recent excavations at Rakhigarhi in Hissar district of Haryana may push the history of the civilization back by over a thousand years. It could change the commonly held view about the Indus Valley civilization, as Rakhigarhi is situated on the bank of the now dry, Saraswati river. Archaeologists and historians are excited about the findings from Rakhigarhi, the largest Indus Valley site after Mohenjodaro. Archaeologists consider this to be no ordinary Harappan site and say it is the most important of all the archaeological sites of India. The unearthed clues may yield answers to many unanswered questions. Rakhigarhi findings have already started showing new civilization contours. The area and dimensions of the site are far wider than assessed by archaeologist Raymond and Bridget Allchin and J M Kenyer. It is 224 hectares, the largest in the country.

In size, dimensions strategic location and unique significance of the settlement, Rakhi Garhi matches Harappa and Mohenjodaro at every level. Three layers of Early, Mature and Late phases of Indus Valley civilization have been found at Rakhi Garhi. What has so far been found indicates that Rakhi Garhi settlement witnessed all the three phases.

The site has trick deposits of 'Hakra Ware' (typical of settlements dating back before the early phases of Indus Valley). 'Early and 'Mature' Harappan artifacts. The solid presence of the Hakra Ware culture raises the important question: "Did the Indus civilization come later than it is recorded?" The Hakra and the Early phases are separated by more than 500-600 years and the Hakra people are considered to be the earliest Indus inhabitants. Although the carbon-14 dating results are awaited, based on the thick layers of Hakra Ware at Rakhi Garhi, it is said that the site may date back to about 2500 BC to 3000 BC. This pushes the Indus Valley civilization history by a thousand years or more. While this site came to light in 1963 excavations at Rakhigarhi started only in 1997.

Had excavations started 70 years earlier, when Harappa and Mohenjodaro were uncovered, the story would have been different. Fossils indicate that the Harappan man reared cattle. The findings are startling. Rakhi Garhi was settled on the banks of a river Dhrishdwati, which was a tributary of the river Saraswati. Copper fishing hooks and woven nets found at the site affirms the river's existence nearby. It is thought that the people living in this city traded with other people using this river for navigation.

The site's antiquities, drainage system and signs of small-scale industry are in continuity with other Indus sites. All this adds one more dimension to the whole debate on Indus civilization. Many feel that since this site is situated on the Saraswati river, it is more likely connected to the Vedic civilization. All this only add to the enigma called Indus civilization, rich in facts, richer still in speculation. What stands out from the churning debate is the fact that much more perhaps still remains shrouded in the folds of the past centuries. The real and very important part played by Haryana in India's history is yet to be fully understood.

Digging so far reveals a well planned city with 1.92 m wide roads. Pits surrounded by walls have been found, which are thought to be sacrificial pits or for some religious ceremonies. Which shows fire was used extensively in their religious ceremonies. There are brick lined drains to handle sullage from the houses. Among other things that have been found are, terracotta statues, weights, bronze artifacts, combs, needles and terracotta seals. A bronze vessel has been found which is decorated with gold and silver. A gold foundry with about 3000 unpolished semi-precious stones has been found. Many tools used for polishing these stones and a furnace were found there. A burial site has been found with 11 skeletons with their heads in the north direction. Near the heads of these skeletons, utensils for everyday use are kept. The three female skeletons have shell bangles on their left wrists. Near one female skeleton, a gold armlet has been fond. In addition semi precious stones have been found lying near the head, showing that they were part of some sort of necklace.
http://www.haryana-online.com/History/archaelogical_sites.htm
http://www.haryana-online.com/rakhigarhi.htm
Kunal. A small area of 1.2 hectares with a vertical deposit of over 3 m. The radiocarbon dates place the site between ca. 3016 and 2577 BC (Lal 1997, p. 84). Copper arrow-heads and fish-hooks; micro-beads of chalcedony. Red ware bearing painted designs in two colours (black outline filled in with white) are characteristic of a number of sites along the Sarasvati_ valley. Potsherds of Hakra ware (Cholistan) were also found at the site. In the next period, painted motifs on pottery included peacock and pipal leaf, typical of the designs of the Mature Harappans. A globular jar of red ware yielded silver ornaments wrapped in a silver sheet: two tiaras (small and large), each with a large fully-opened flower having petals topped with a decoration like the Greek letter 'alpha' (Khatri and Acharya, 1995: 86) Along with these tiaras was a multi-spiralled armlet which is similar to the armlet worn by the bronze statue of the 'dancing girl' from Mohenjodaro. In another house were found a large number of gold/silver-beads: cup-shaped, barrel-shaped, discular; shapes which are characteristic of the Mature Harappans. Discular beads of silver with perforation along the diameter found in Kunal (Hissar, Haryana) have occurred at Mature levels at Lothal, in gold. Other parts of the site yielded beads of lapis lazuli, carnelian, faience. Copper objects were produced at the site as evidenced by the discovery of a terracotta crucible with molten metal still sticking to it. The objects included: axes, fish-hooks, spearheads, iverted 'V-shaped' arrow-heads, coiled cones and coiled finger-rings which are characteristic of Mature Harappans. Seven seals (six of steatite and one of shell) were found. They are square-shaped with a perforated knob at the

back, again anticipating the Mature Harappans. The seals bear only geometric motifs and without any inscriptions.
http://www.hindunet.org/hindu_history/sarasvati/html/settlement_plans_and_architectur.htm

Kunal, District Fatehabad

The credit of discovery of the site goes to the Archeologists of this department in the year 1981. The Archeological excavations at this pre-Harappan site of 5000 years old was started in the year 1986 and is continue till date with a few field-season's gap of the year 1992-93, 1996-97, 1998-99, 1999-2000, 2001-2002 and 2002-2003. Three successive phases of occupation from pit dwelling to that of square and rectangular mud brick houses have come to light and are supposed to be the earliest remains of pre-Harappan culture in India.A
hoard of regalia item including six gold beads of a necklace, an armlet and a few bangle pieces and 12445 beads of semi-precious stones is first of its kind.It makes the whole gamut of luxury items as 'richest' when seen in the context of rural nature of settlement of 3000 BC one of the important contributions of this site is the discovery of steatite and shell seals, which are the earliest example of seal manufacturing in India so for.The results of these excavations were extremely significant which led to the formation of Harappan culture.At the same time,the first time discovery of steatite seals and regalia items from the pre-Harappan level added a new dimension to the Indian history and archaeology of this region particularly.
IAR 1985-86, pp. 23-25; 1991-92, pp. 37-39; 1993-94, pp. 47-51; 1994-95, pp. 26-27

Banwali, District Fatehabad

Archaeological excavatioin at this proto-historic site from the year 1974 to 1977 brought to light a pre-Indus and Indus township and other material including beads and bangles of semi-precious stones, copper ornaments and tools, steatite seals, terracotta sealing, toys and ornaments blades and weights of Chart and agate etc. along with a large variety of pottery of 3rd millennium B. C. The discovery of un-usual Indus town planning, first mother goddess terracotta figurine in independent India and a beautiful terracotta replica of a plough brought this site on the map of National Improtance. The Archaeological survey of India has taken over this site under the protection.

http://archaeologyharyana.nic.in/arc2.html
Khatri, J.S. and M. Acharya. 1995. Kunal: A New Indus-Saraswati_ Site. *Puratattva*, 25: 84-86.

Banawali Mound, previously called Vanawali, lies 14 km, north-west of Fatehbad on the right bank of the Rangoi Nala, 29° 37" 5' north latitude and 75° 23",6' cast longitude. This ancient mound spread over an area of one sq km, rose to a height of about 10 meters due to successive settlements on the earlier rubble.

The archaeological excavations done here by the Department of Archaeology, Haryana have revealed a well constructed fort town of the Harappan period overlying an extensive proto-urban settlement of the pre-Harappan culture. If the discovered ancient relics are pieced together, a fairly coherent picture emerges and it can be conjured up that if Kalibangan was a metropolitan town over the lower middle valley of the Saraswati, Banawali was possibly one over the upper middle

course of that river.

The pre-Harappan age (2800 BC - 2300 BC) and Harappan era (2300 BC - 1800 BC) combined are called the Indus valley civilization, while the preceding Vedic age (4000 BC - 2800 BC) can be called the Saraswati valley civilization.

The era of pre-Harappan period (2703 BC - 2300 BC) is characterized by the typical pottery, settlement pattern and architecture. A wide range of to those found at Kalibangan in Rajasthan, illustrates the developed ceramic art of the settlers here. Banawali seems to have been abandoned by 1900 BC with the drying up of Saraswati.

A rich variety of shapes and designs speaks highly of the level of their socioeconomic existence and their aesthetic taste. The houses were built roughly along cardinal directions and points to definite town planning. Constructed usually of mould-made bricks, we find, occasionally, structures made of kiln-baked bricks. The civilization seems to have been conversant with the technology of copper smelting. Among personal ornaments, beads of gold, semi-precious stones, terracotta and steatite and bangles of clay, shell, faience and copper have been. recovered during the course of excavation. The overall picture presents a fair degree of advancement - achieved by the pre-Harappans by the middle of the - 3rd millennia B.C.

While the pre-Harappan culture was still young, a new set of people occupied Banawali. They soon built a well planned and fortified township in the *classical chessboard pattern*. The broad arterial streets, running from north to south, have been found straight and uninterrupted, whereas those, running from east to west, were usually narrow and staggered. This planning, perhaps protected the, town from the blistering winds of the west and. severe monsoon, rains of the south-west.

The town seems to be divided in two sub-joined fortified areas, one separated from the other by a 6-7 meter thick wall running centrally across the mound from north to south. A narrow opening, provided through the defense wall in the center of the mound, was, perhaps meant for communication between the two parts of the city blocks, of which the better fortified western side was dominated by the elite, while the commoners and business communities lived in the eastern wing. This gate was guarded by a massive, square bastion.

Planned mud-brick houses, with several rooms, a kitchen, a toilet, etc. are found built on either side. of the roads and lanes. Their sanitary arrangements depended on the use of sanitary pottery jars which served as washbasins, as also for soakage purposes. Except in a few places, which demanded constant use of water, structures were usually made of sun baked bricks meticulously molded into various sizes. Numerous household items like ovens, hearths, tandoors and blades made of chert and other stones, and sophisticated, ceramics known for their fanciful shapes have been excavated. The principal kinds of pottery recovered included vases, fruit stands, chalice cups' handled clips, 'S-shaped jars' perforated jars, cooking handis, beakers, basins, rooters, etc:

Among painted motifs, peacocks, Pipal and banana leaves, trees, deer, 'stars, fish, flowers, intersecting circles, checker-board patterns and honeycomb patterns are of special -interest. It is noteworthy that the pre-Indus ceramic tradition, continues here throughout, whereas at Kalibangan, it dies out, half-way through. The Harappan seals recovered here depict a rhinoceros, ibex, wild goat, unicorn, - a composite animal with a tiger's body and horns and the cubical weights and gamesman type of weights made of stones and ivory or bone reveal a great degree of precision and superb craftsmanship of the Harappan artists.

Gold, copper and bronze pieces found here indicate that they had a profound knowledge of metallurgy. Among ornaments have been found beads of gold, copper, agate, carnelian, Lapis lazuli, faience, shell, bone and clay, bangles of copper, faience shell and terracotta, and pipal leaf shaped ear rings of faience.

Certain figurines of mother Goddess and the like suggest that the Harappans were very fond of decorating their persons with elaborate headgear, ear rings, necklaces, garlands, etc. Copper and bronze were used for weapons and tools as also for ornaments and items included arrows, spearheads, razor blades, chisels, fish hooks, beads, rings, bangles, antimony rods, wires and hair pins. Iron, however, was not known to them. Terracotta figurines of bulls, buffaloes, deer, dogs, rhinoceros and. birds are not only the evidence of their folk art tradition, but also throw welcome light on the fauna of those bygone days.

This site is one of most important archaeological sites of Haryana. It has attracted the attention of Indian archaeologists and in importance, it rivals Kotdljl and Chanhuo (Sind-Pakistan). Kalibangan (Rajasthan), Surkotda and Lothal (Gujarat), RakhiGarhi (district Hissar) and Mittathal (Bhiwani district).

http://www.haryana-online.com/banawali.htm

Banawali (29°31'; 75°30'), Dt Hissar, Haryana.
Banawali is located 15 km n.-w. of Fatehabad, on the left bank of dried up bed of the Saraswati. The excavation at Banawali was undertaken by R.S. Bisht on behalf of the Dept of Archaeology, Haryana during 1974 to 1977, and later on by ASI revealing three Periods.

Period I (c. 2500-2300 B.C.) is indicated by the existence of well-planned houses made of kiln-burnt and moulded brick. In technique, decoration and general appearance the pottery may be divided into two broad groups: one is thin and light in fabric with pink or buff colour and is elaborately painted in black. White pigment has been used to give prominence to the principal motifs. The shapes comprise the vase and jar. The second group represents a finer variety of pottery marked by a superior texture and surface treatment. It is probably made on fast wheel and is comparable with the Harappa ceramics in fineness. The pottery assemblage is quite similar to the assemblage of Kalibangan I. The main finds comprise beads of gold, semiprecious stones, terracotta and steatite and bangles made of clay, shell, faience

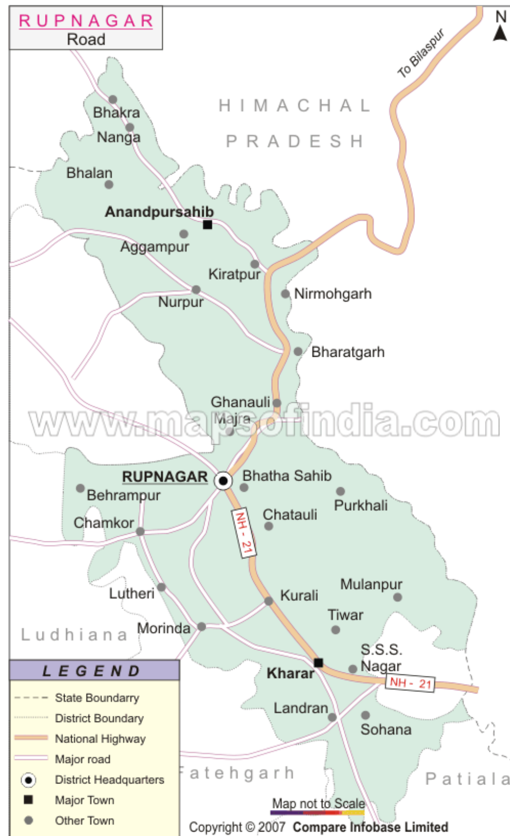
and copper. A blade of chalcedony has also been found.

In Period II (c. 2300-1700 B.C.), a well-planned fortified township laid in the typical Harappa chess-board pattern was established. It consists of two adjacent fortified areas- one may have been for the ruling class and the other for the common people. The area meant for the common people is subdivided into house blocks, with broad north - south thoroughfares, cut at right angles and connected by east - west lanes. A defence wall has been traced to a length of 105 m with a height of 4.50 m and a thickness of 6 m. The houses are well-planned comprising rooms, store, kitchen and toilet built on both sides of the roads and lanes. The houses generally have floors of rammed earth, mud walls plastered with husk or cowdung and flat earthen roofs on reed cushion supported by wooden beams and rafters. The red ware is typically Harappa and has a sophisticated finish. The shapes comprise the dish-on-stand, fruit-stand, S-shaped jar, storage or refuse jar, perforated jar, vase, cooking handis, beaker, basin, goblet, chalice cup, handled cup, etc. They are painted with animal and floral designs.

Period III (c. 1700-1500/1450 B.C.) represents the BARA ware culture, the remains of which are traceable in the pits cut into the Harappa levels of the mound. The ceramics of Periods II and Ill are different form each other in respect of fabric, slip, potting technique and painting, though certain Harappa traditions continue in pottery,

terracotta nodules and cakes. The excavation makes it clear that the Harappa brought with them their mature and well-developed traditions and lived side by side with the earlier residents. The Bara ware may be termed as post-Harappa or at best a late contemporary of the Harappa.

http://asi.nic.in/asi_exca_imp_haryana.asp
Bisht, R.S. 1994. Banawali. In J.P. Joshi and R.S. Bisht, *India and the Indus Civilization*, pp. 23-31. New Delhi
IAR 1983-84, pp. 24-29; 1986-87, pp. 32-34; 1987-88, pp. 21-27



Rupar At Rupanagara, Sutlej river takes a





steep 90-degree turn creating a large gorge, clearly demonstrating the migration of the river westwards, away from River Sarasvati which Sutlej had joined at Shatrana in ancient times (See map prepared by Prof. KS Valdiya). Bhatinda has two of the largest archaeological settlements of Sarasvati civilization, yet to be excavated: Gurnikalan (144 ha), and Hasni or Hasanpur (100 ha), both situated on the banks of ancient River Sarasvati. These are apart from Lakhmirwala (Mansa Dist., 225 ha) and Ganweriwala (Cholistan, Pakistan, approx. 80 ha).

PUNJAB
ASSEMBLY CONTITUENCIES
TOTAL SEATS: 117

1 Fatehgarh Churian
2 Batala
3 Qadian
4 Srihargobindpur
5 Kahnuwan
6 Dhariwal
7 Gurdaspur
8 Dinanagar
9 Narot Mehra
10 Pathankot
11 Sujanpur
12 Beas
13 Majitha
14 Verka
15 Jandiala
16 Amritsar North
17 Amritsar West
18 Amritsar Cent.
19 Amritsar South
20 Ajnala
21 Rajasansi
22 Atari
23 Tarn Taran
24 Khadur Sahib
25 Naushahra Panwan
26 Patti
27 Valtoha
28 Adampur
29 Jalandhar Cantt.
30 Jalandhar North
31 Jalandhar Cent.
32 Jalandhar South
33 Kartarpur
34 Lohian
35 Nakodar
36 Nurmahal
37 Banga
38 Nawanshahr
39 Phillaur
40 Bholath
41 Kapurthala
42 Sultanpur
43 Phagwara
44 Balachor
45 Garh Shankar
46 Mahilpur
47 Hoshiarpur
48 Sham Chaurasi
49 Tanda
50 Garhdiwala
51 Dasuya
52 Mukerian
53 Jagraon
54 Raikot
55 Dakha
56 Qila Raipur
57 Ludhiana North
58 Ludhiana West
59 Ludhiana East
60 Ludhiana Rural
61 Pail
62 Kum Kalan
63 Samrala
64 Khanna
65 Nangal
66 Anandpur Sahib
67 Chamkaur Sahib
68 Morinda
69 Kharar
70 Banur
71 Rajpura
72 Ghanaur
73 Dakala
74 Shutrana
75 Samana
76 Patiala
77 Nabha
78 Amroh
79 Sirhind
80 Dhuri
81 Maler Kotla
82 Sherpur
83 Barnala
84 Bhadaur
85 Dhanaula
86 Sangrur
87 Dirba
88 Sunam
89 Lehra
90 Balluana
91 Abohar
92 Fazilka
93 Jalalabad
94 Guruharsarai
95 Firozpur
96 Firozpur Cantt.
97 Zira
98 Dharamkot
99 Moga
100 Baghapurana
101 Nihalsinghwala
102 Panjgrain
103 Kotkapura
104 Faridkot
105 Muktsar
106 Giddarbaha
107 Malout
108 Lambi
109 Talwandi Sabo
110 Pakka Kalan
111 Bhatinda
112 Nathana
113 Rampura Phul
114 Joga
115 Mansa
116 Budhlada
117 Sardulgarh

KBK

See Constituency 115 (Mansa) shown on map. Lakhmirwala is situated on the banks of Sirhind stream (a tributary of Ghaggar).

IAR 1953-54, p. 6-7; 1954-55, p. 9. Rupnagar is to the North West of Chandigarh (the nearest airport) and at a distance of nearly 50 km from Chandigarh.

Rupar - Witness To Six Ancient Civilisations

Rupar is a 21 metre high ancient mound overlaying the Shiwalik (also spelt as Sivalik or Shivalik) deposition on the left bank of the river Sutlej where it emerges into the lains. It has yielded a sequence of six cultural periods or phases with some breaks from the Harappan times to the present day. The excavations were carried out by Dr. Y.D. Sharma of ASI. The migration of the Harappans to Rupar has been postulated through the lost Saraswati River to the Sutlej as both the river once belonged to one system.

Period I

At Rupar excavation, the lowest levels yielded the Harappan traits in Period 1, which falls in the proto-historic period. A major find was a stealite seal in the Indus script used for the authentication of trading goods, impression of seal on a terracotta lump of burnt clay, chert blades, copper implements, terracotta beads and bangles and typical standardised pottery of Indus Valley civilisation. They flourished in all the Harappan cities and townships.

The earliest houses at Rupar were built with river pebbles available in abundance but soon they made use of cut slabs of lime with the same ratio of 4:2:1. Sun baked bricks were sometimes used in the foundations. Houses were built to suit climatic

conditions. Walls were plastered with built to suit climatic conditions. Walls were plastered with water repelling sticky clay. In the north, flat roofs were common but deep-pitched roofs were used along the west coast - Bengal and Assam - due to heavy rainfall.

The dead were buried with head generally to the north and with funerary vessels as unearthed in cemetery R-37 at Harappa (Sind, Pakistan). What led the Harappans to desert the site is not known.

Period II

Period II belongs to Painted grey ware people who followed the Harappans. Typical pottery of this period consisted of fine greyware painted black, terracotta bangles, semi precious stones, glass, bone arrowheads, ivory kohl sticks and copper implements. This period is identified as the period belonging to the Great War Epic - Mahabharata.

A new settlement sprang up here by about 600 BC - chronologically Period III at Rupar. Grey pottery of Period II still continued. This period belongs to circa 600 BC to 200 BC. It yielded the earlier coins (punch marked and uninscribed cast coins), copper and implements. An important find was an ivory seal inscribed in Mauryan Brahmi script (4th and 3rd century BC)

Minutely carved and polished stone discs with a figure and motif associated with the cult of the Mother goddess of fertility have also been unearthed in the excavations from Taxila (now in Pakistan), Patna in the state of Bihar and other Mauryan sites. Houses of mud and kiln burnt bricks were by no means rare. A 3.6 metre wide burnt brick wall traced to a length of about 75 mts probably endorsed a tank which collected water through inlets. The upper levels have soak wells lined with terracotta rings of Sunga and Kushana periods.

Period III To V

From Period III to V there are fairly rich dwelling complexes with houses of stone and mud bricks. The full plans of the houses could not be exposed owing to the vertical nature of excavations carried out.

Period IV

The next phase, Period IV revealed the evidence of the Sungas, Kushans (also spelt as Kushana) and Guptas and their successors. Excavations also revealed successive building levels of various dynasties. In the upper levels a hoard of copper coins of Kushan and Gupta rules were found. This includes a gold coin issued by Chandragupta-Kumerdevi of the Gupta dynasty, which is also known as the golden age in ancient Indian history.



A large number of terracotta figurines of

Sunga, Kushana and Gupta periods were also discovered. Among them was a Yakshi figure with cherubic expression and a beautiful seated figure of a lady playing on the lyre reminiscent of Samudragupta's figure in a similar position on the famous gold coins of the Gupta dynasty. A set of three silver utensils for ritualistic purpose with Greek influence depicts the fine craftsmanship of the Gupta dynasty in its chased decoration.

The pottery of this period in the upper levels is for the most part red ware and is frequently decorated with incised motifs. After a short break, there is evidence of a fresh occupation identified as Period V commencing around the early 6th century and continuing for three or four centuries. The coins of Toramana (circa AD 500) and Mihirakula (circa 510-40) have been recovered from these levels. The spacious brick building of the fifth period were constricted neatly and evidences showed a good measure of prosperity during this period.

Probably after desertion, a new town sprang up here around 13th century AD on the same site named Period VI and it continues to flourish to the present day.

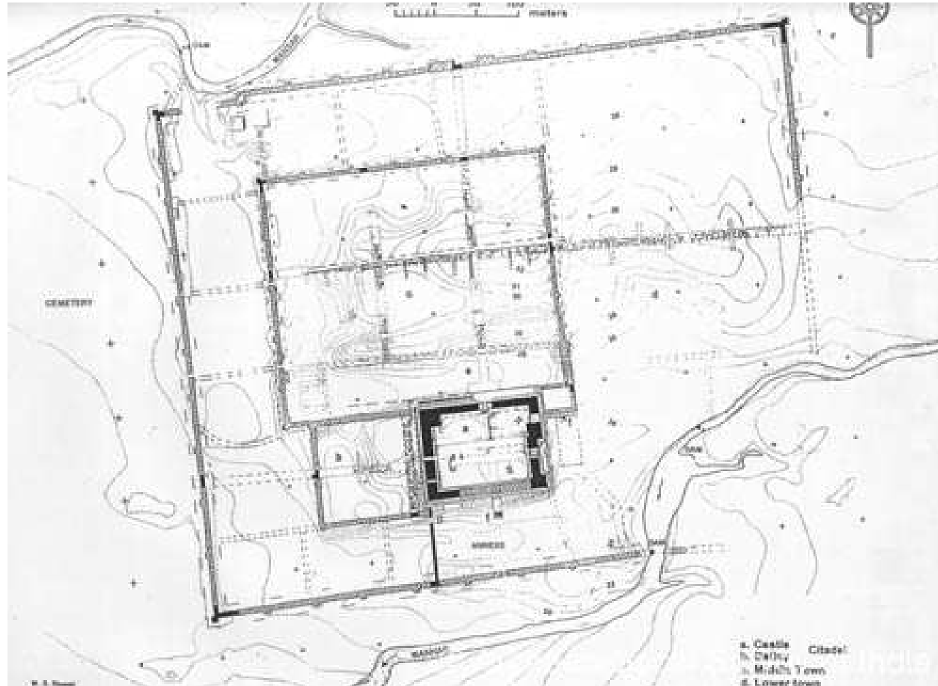
An archaeological site museum has been set up to house some of the antiquities of Rupar along with the photographs displaying excavation material.
http://www.travel-himalayas.com/history-himalayas/rupar.html
DHOLAVIRA
According to Dr. R.S. Bisht, leader of the archaeologists team busy with excavation at Dholavira "Dholavira ranks with Mohenjodaro and Harappa (both now in Pakistan) as one of the three largest urban centres of the Harappan civilisation".
Dholavira is one of the three largest centres of that lost civilisation, but that this could be lthe first known Indian city lost and buried under the earth for the last 4,000 years. Lost, in fact, so long ago that all we know, according to ancient India historian Romila Thapar, "is that it predates Sanskrit, and even the Vedas."
Some people refer to this culture as the Indus valley civilisation, others call it Harappan civilisation. But both refer to the startling discovery in 1922 of an advanced urban civilisation when British archaeologists stumbled upon Mohenjodaro in Sindh, Pakistan. It was recorded, after careful research, as having flourished from 2500 BC to 2200 BC, contemporaneous with the Egiptian and Sumer civilisations, and larger than them in area. All three belong to the Bronze Age, and all perished roughly around the same time in 1500 BC.
The lower layers of the Dholavira site go back to 3000 BC, and upper layers at the town's outer edges to 1500 BC, claims Bisht : "It is here more than anywhere else that we witness both bthe rise and fall of Harappan civilisation. Its rise from rural campsite to fortified towns around 3000 BC, their development through urban planning and water management which reached its zenith around 2500-2200 BC and its downfall and return to scattered villages from 1500 BC onwards."
Dholavira is significant also because it establishes, according to Jagat Joshi, the archaeologist who first discocered the site , "the foot-prints of the Harappans on our side of the border, since both Mohenjodaro and Harappa went to Pakistan after Partition. Surely, we all felt, a society whose geography stretched from Sindh to northwest Punjab must also have spilled over here ? SSMy hunch bore fruit after

looking around for years, when we began to find one Harappan site after another,



covering a wide area, from Maharashtra and Gujarat in the west to Jammu in the north and UP in the east."
"ASI teams have unearthed 700 sites which bear the stamp of Harappan civilisation. Of these, some 35 have been dug up, suggesting that the Harappan empire spanned an area of half-a-million square kms. stretching from Afghanistan, Baluchistan and Punjab, to Delhi and UP in the east and Harayana, Rajasthan and Gujarat in the west." Though the site was first discovered over a decade ago,full-scale digging began in 1990, with Bisht as project director.
"Dholavira was built on sloping terrain between two rivers - Mansar in the north and Manhar in the south. The town was enclosed by a massive wall, designed like a large parallelogram roughlt one square kilometre in area. Along the town's walls are aseries of water reservoirs covering its three main parts which we call the Citadel, the Middle Town and the Lower Town. In its heyday, Dholavira;s population was perhaps about 200,00, half the 40,000 estimated for Mohenjodaro."
This heap of stones is only 4,000 yearsold, and that below it are sun-dried bricks which go back 5,000 years; that this broken bangle is made of the sea shells Dholavira's womenfolk wore, several to each arm.
And that the sea shells suggest that the nearby Rann of Kutch was not the semi-arid zone it is today, or that Dholavira's residents imported the shells from elsewhere in coastal Gujarat as a part of their regular trade.
According to Dr. Bisht "Trade" was very important to Dholavira's economy because this region has never been agriculturally fertile, though it was much greener then. They discovered an interesting network of small and large drains which intersect each other. The larger drains are big enough to allow a person to walk through them. Their thought, their planning, never ceases to amaze him.
"The drains were probably used to collect and carry monsoon run-off water to a tank for later use. Water conservation was a critical necessity here, and the drying up of water sources - due either to mountain streams changing course radically, or to over-use - might have caused the death of Dholavira".
More confirmation of Dholavira being the Harappan civilisation's Indian outpost par excellence comes from the metal tools, the pottery, and the steatite seals found at the site. These seals are both impressive and enigmatic. Ranging in size from 3/4 inch to 1.5 inches square, most of them have a pierced boss at the back to accommodate a cord for handling or for use as personal adornment.
"Although the pictographic symbols (like the unicorn in Dholavira's seals, the bull and the rhino in Mohenjadaro's) remain one of archaeology's great mysteries, the variety of the text on the seals suggests personal identities rather than religious phrases", writes art historian Roy Craven.
Archaeologist Shireen Ratnagar at Delhi's Jawaharlal Nehru University says that these Harappan seals were probably marks of identity, indicating where the person or his consignment was coming from in ancient India's trade with West Asia. "They

may also indicate the consignment's value, because remember, trade in the Bronze Age predates the invention of money. Several of these seals have been found in the Gulf, Iraq, Egypt. Our Harappan ancestors were world travellers, you could say."
http://www.gujaratinformation.net/places/places.html



Being one among the five largest Harappan cities in the subcontinent, Dholavira has yielded many firsts in respect of Indus civilization. Fourteen field seasons of excavation through an enormous deposit caused by the successive settlements at the site for over 1500 years during all through the 3rd millennium and unto the middle of the 2nd millennium BC have revealed seven significant cultural stages documenting the rise and fall of the Indus civilization in addition to bringing to light a major, a model city which is remarkable for its exquisite planning, monumental structures, aesthetic architecture, amazing water harvesting system and a variety in funerary architecture. It also enjoys the unique distinction of yielding an inscription made up of ten large-sized signs of the Indus script and, not less in importance, is the other find of a fragment of a large slab engraved with three large signs. This paper attempts to give an account of hydro-engineering that is manifest in the structures of the Harappans at Dholavira.

The ancient site at Dholavira (230 53' 10" N; 700 13'E), taluka Bhachau, district Kachchh in state Gujarat, lies in the island of Khadir which, it turn, is surrounded by the salt waste of the Great Rann of Kachchh. The ancient settlement is embraced by two monsoon channels, namely, the Manhar and Mansar. The ruins, including the cemetery covers an area of about 100 hectares half of which is appropriated by the articulately fortified settlement of the Harappans alone.

The salient components of the full-grown cityscape consisted of a bipartite 'citadel', a 'middle town' and a 'lower town', two 'stadia', an 'annexe', a series of reservoirs all set within an enormous fortification running on all four sides. Interestingly, inside

the city, too, there was an intricate system of fortifications. The city was, perhaps, configured like a large parallelogram boldly outlined by massive walls with their longer axis being from the east to west. On the bases of their relative location, planning, defences and architecture, the three principal divisions are designed tentatively as 'citadel', 'middle own', and 'lower town'.
The citadel at Dholavira, unlike its counterparts at Mohenjodaro, Harappa and Kalibangan but like that at Banawali, was laid out in the south of the city area. Like Kalibangan and Surkotada it had two conjoined subdivisions, tentatively christened at Dholavira as 'castle' and 'bailey', located on the east and west respectively, both are fortified ones. The former is the most zealously guarded by impregnable defences and aesthetically furnished with impressive gates, towers, salients and drainage. To the north of the citadel a broad and long ground, probably used for multiple purposes such as community gathering on festive or ceremonial occasions, a stadium and a marketing place for exchanging merchandise during trading seasons (s). Further north, there was laid out the enwalled middle town while to its east was founded the lower town. The last -mentioned one did not have an appurtenant fortification though, it was set within the general circumvallation.

Besides to the south of the castle, across the adjoining reservoir, there was raised another built-up area running along the city wall, perhaps, designated as annexe or a warehouse meant for housing the retainers and menials.

The layout that is briefly described above pertained to the fully-developed form of the Harappan city. There are identified seven major cultural stages, serially numbered from Stage I to Stage VII which document the gradual rise, culmination and fall of the Urban System of the Harappan civilization vis-s-vis the settlement which spread over a time period of one and a half millenniums spanning the whole of the 3rd millennium and half of the following.



The first settlement of Stage I was a strong fortress now lying buried in the castle mound. A part of the southern arm of its fortification that was laid bare near the south-western corner measured 11.10 m at the base. It showed tapering sides to an extant height 4 m. The foundation of the planning that was laid in Stage I formed the nucleus on which the subsequent settlements of the later stages expanded gradually. Even the building materials, whether standardized bricks (9 x 8 x 36 cm, ratio 1 : 2 : 4) or stone, both undressed and dressed, remained in use, subsequently through Stage V.

In Stage II, a 2.80 m thick brick masonry wall was added to the pre-existing defensive wall from the inner side and the face of it was plastered over with fine paste of white

and pink clays at least as many as thirteen times. There is another significant development that took place. A residential area was coming up to the north of the walled settlement. Besides, pottery forms and antiquities diversified as well as increased in both quality and quantity.

Stage III, sub-divided into two phases, i.e. IIIA and IIIB, was a most creative and important one in many respects: the southern arm of the antecedent fort-wall was further widened from the inner side with an additional brick-masonry of about 4.5 m and the existing walled settlements was made into a castle and another walled subdivision, arbitrarily called as bailey, was added to it from the west. In the north, the extended residential area of Stage II was cleared of structures for carving out a multipurpose ground. Further north, the extensive walled town (which would become middle town subsequently) was founded. Reservoirs were created on the south, west and north of the built-up divisions on an ostentatious scale and design. And, finally, an outer fortification in order to surround all the components was constructed during this stage. For the first time, three square steatite seals much smaller and lighter and furnished with figures but without inscriptions appeared in addition to a potsherd bearing Indus signs and also a cubical weight. Besides, a good number of classical Harappan pottery forms with painted motifs made their debut.

When the town of Stage III had lived two-thirds of its life, it was immensely damaged by a catastrophe. Its tell-tale marks were vividly present in the defensive wall of the castle. Repairs were undertaken, the lower town was added and the city-walls were extended further eastwards in order to enclose the new additions. As a result, the erstwhile town attained full cityscape that dominated the cultural scenario for centuries through Stages IV and V.

Significantly, during the first three stages, i.e., I, II and III, the inhabitants exhibited an abiding preference for colourful clays, e.g., white and pink for plastering nearly all the structures whether defensive walls, roads, streets, ceremonial ground, or the walls and floors of private houses. Even roof tops of the houses might have been treated similarly. But, this tradition came to an abrupt end with the end of Stage IIIB and beginning of Stage IV, as if under a royal decree or by a resolute public consensus. At Stage IIIB, the cityscape had attained its fullest growth.

Stage IV belonged to that form of the classical Harappan culture which is so widely familiar with from a large number of excavated sites. Almost all the salient features of the city planning were scrupulously maintained along with the monumental structures such as gateways, fortification, drainage system. The famous ten-signed inscription of unusually large size was surely in use during this stage. All the classical Harappan elements such as pottery, seals, weights, beads, items of gold, silver, copper, ivory, shell, faience, steatite, clay and stones are found in abundance.

Stage V is characterized by the general decline particularly in the maintenance of the city. It is more vividly reflected in the citadel. The other items such as pottery, seals, weights, etc., continued in use, however.

This stage was followed by a temporary desertion of the site, perhaps not lasting more than a few decades before the Stage VI ushered in.

Stage VI presents a state of cultural transformation. New ceramic traditions coming from the sides of Sind, Rajasthan, Gujarat and far-off region in the north made appearance. The one-time city shrank into a smaller town, confined to the citadel and the southern margin of the middle town only although some of the existing fortification walls were kept in use, a new wall of different construction was raised on the north for delimiting the settlement. The classical planning was largely given a go-by. Domestic buildings were laid out in a different planning. Bricks were no longer in use. While many of the pottery forms and decorative motifs were still in vogue, new ceramics in the form of white painted black-and-red and white painted grey wares along with a coarse ware bearing incised or appliqué or both kinds of designs and also some Bara related pottery made their appearance. Many other traditional items continued in use though the seals underwent a change. Rather being square in form, those were long rectangular with a flat or triangular back with a hole for string. The seals still bore nicely cut inscriptions but no figures. Stone cubical weights were still in vogue in addition to similar ones cut out of potsherds. Overall picture that is projected is that impoverishment and rapidly crumbling urbanism. Having lived there for about a century, the late Harappans of Stage VI abandoned the settlement.

The desertion that followed was certainly a longer one. How long? It is not certain at present. The new comers of Stage VII had forgotten the classical Harappan fabrics, shapes and designs. Strangely enough, the newcomers built their houses in an entirely new form that was circular. No planning as such is discernible. All the urban attributes became conspicuous by their absence.

Thus the urbanization that made its humble beginnings in stage I and went on progressing through Stages II, III and IV, started decaying in Stage V and underwent a transformation in Stage VI with a feeble revival only to become totally deurbanised in Stage VII. The site was never occupied thereafter.



Lying between the monsoon channels and being undulating sloping towards the south, the site was ideally suited for a settlement having artificial dams and reservoirs.

The city of Dholavira in its fullest form was a precisely proportionate whole and proportionality resolved configuration following a resolute set of principles of planning and architecture with mathematical precision and, perhaps, with astronomically established orientation. Of the city, at present, three corners with partially eroded towers but fully intact inner corners have been confirmed by excavation. When measured between the inner corners, the E- W length of the city area along the northern defensive wall and N-S one along the western one worked out to 771.10 m and 616.87 m, respectively - thus giving the precise ratio of 5 : 4. Similarly, the other divisions of the city also revealed amazing ratios and proportions. The following table provides revealing information:

Sl. No.	Division	Width	Length	Ratio
1	City, internal	616.87	711.10	4 : 5
2	Castle, internal at available top	92	114	4 : 5
3	Castle, external (as per present exposure)	118	151	4 : 5
4	Citadel (castle + bailey), external	140	280	1 : 2

	approximately (including bastions)			
5	Bailey, internal	120	120	1 : 1
6	Middle Town + Stadium, internal	290.45	340.5	6 : 7
7	Middle Town, excluding Stadium, internal	242	340.5	5 : 7
8	Stadium, internal	47.5	283	1 : 6
9	Lower Town, built-up area	300	300	1 : 1

The above table inter alia reveals the proportional relationship between the castle and the city so it does in respect of intra-divisional and inter-divisional measurements. It is interesting to give another illustration: the diagonal drawn between the two opposite angles made by the north-eastern and the south-western corners of the city touched the north-western corner of the castle. While of the remaining two, the south-eastern corner is still missing, or not found out, a line, therefore bisecting the north-western angle also bisected the north-western corner of the middle town and further on cut across a crossing of four streets and finally the north-eastern corner of the castle. This could have been achieved by precise mathematical calculations and drawings which were then translated on the ground that was undulating by 13 m in gradient. It was indeed a great engineering achievement. In the whole scheme, the enwalled area of the castle became 49th (7 X 7) part of the city while its total built-up area was 25th (5 X 5) part.

Furthermore, it is very significant that the two-thirds of the middle town and the whole of lower town were planned with bold projections and recesses just like those one finds in the layout of an Indian temple of the later ages. As a result, the city divisions were provided with a number of housing sectors and spaces. Some of latter were found to have been used for dumping domestic refuse. Another significant feature is the arterial street that ran across axially from west to east dividing all the above-mentioned units and sub-units into two equal halves, and a north-south street, perhaps somewhat staggered, further subdivided each unit.

The lower town, too, was resolved into several units. Each unit seems to be having likewise projections and recesses and in turn demarcating an opens pace, of course. The arterial street of the middle town passed through a gate in eastern fortification wall and then went on running across the lower town albeit with a few turns, each at the end of a residential sector. The street however remained uninterrupted. Other major and minor streets and lanes shot off from the axial street for making a defined network of housing sectors.

Seventeen gates, all built in the fortification walls with equally interesting add-on components, have been exposed so far. Their number-wise break up is: cattle 5, bailey 2, stadiums 4, middle town 1, annexe 2 and the remaining 3 belonging to the late Harappans of Stage VI.

Being fairly much preserved, those bear immense archaeological and architectural significance interestingly, each castle gate is designed differently. Four of them,

constructed somewhat, if not precisely, in the centre of each arm of the fortification, were regular gates while the fifth as an additional one in the eastern wall served some specific purpose as the flight of its broad steps stopped just halfway down from the top and did not descend onto the ground outside. The south gate was a concealed passageway leading one through open stairs to an exquisite rock cut reservoir. The remaining three, one each on east, west and north, shared a few common features which comprised besides broad and deep passageway and stairs, a high front terrace and a connected pathway with outward gentle slope. All these were duly provided with in the west gate. There the similarity ended. The east gate was more elaborate with a built-in chamber, large and elevated above the sunken passageway which in turn was connected to stairs rising onto the interior of the castle.

The north gate was however the most elaborate and the most elegant and imposing on a vantage location commanding over sprawling cityscape and enchanting landscape. It had two large and elevated chambers flanking the sunken passageway which in turn was connected to an L-shaped staircase ascending from the inner end. Its lofty front terrace, 6m high and 12m deep, was connected to an equally broad pathway with a slope towards the east where it terminated separately onto the little as well as great stadium. The north gate is also remarkable for yielding a spectacularly large inscription made up of 10 unusually big Harappan letters which were surely inlaid on a wooden board since decayed but fairly determinable for its size and shape which matched well with the width of the doorsill of the gate and suggesting thereby that it was originally sported on the façade, right above the door of the gate so as to be visible from afar for its white brilliance.

Of very special should also be the pillars and the pilasters which adorned the interior of the chambers of both east and west gates. Those were mounted on the side walls of chambers for giving support to the respective roofs as well. Each wall had a central pillar and a pilaster at either end, mow represented by their lower members as those were composite ones. These members were skillfully sculpted and smoothened out of bright yellow or banded limestone that was quarried 2.5 km. from the side. Each pilaster has a long basal slab supporting a set of rectangular blocks on what rested the superstructure made of mud concrete bricks, which was most likely encased with three wooden planks with their tongues being close fit into grooves that were cut on each top block while the third plank, was, perhaps, fixed into the other two by side angle joints. Likewise the central pillar, too, has a basal slab supporting a set of square blocks followed by a beautifully carved circular member with concave profile and flattened bottom and top surface. While all those were in situ, there were also found two dislodged ones, both having convex profile as well as tenon hole provision on either flat surface of each. Plausibly, the shaft of the column was wooden one. Contrarily, the central pillar of the western chamber of the north gate was found missing to be represented now by a robber's pit. The corresponding one is the other chamber also suffered from vandalism that was certainly wrought by the late Harappans. Luckily, all its members, which were met with the east gate, were found there although lying topsy-turvy in the pit that was caused right under the precise location of the pillar.

In all, certainly in the north gate, there was a door with double leaves within a massive frame with a sill of limestone at either end of the deep passageway. At each end, there were, perhaps, two doors, one above another as this gate seems to be a double-storied construction with a possibility of a continuous wooden floor running wall-to-wall all over across the chambers and above the sunken passage so as to make a large magestic hall decorated with aesthetic pillars and pilasters and approachable from the rear side, besides the staircase.

We may not be elaborating on the other gates in the city. However, the east gate of the great stadium and the similarly located gate of the middle town, both intercommunicating with the lower town, were also quite elaborate and impressive. Significantly, the west gate of the same stadium was connected with a long and broad corridor with a storm water drain running underneath. The late Harappans gate openings were simple and unpretentious. They were also however using many a Harappan gates.

Very likely, the north gate and also the east gate inter alia served the purpose of royal procession on occasions and the little stadium had a role in that too. Mohenjodaro and Kalibangan have open space between citadel and lower town. At Harappa and Rakhigarhi, it lies to the east of citadel and north of lower town. Archaeologically speaking, no convincing proof of use(s) of such space has been put forward so far. Now, Dholavira can claim a solution to the riddle. It has shown up two such open grounds which should have been put to multipurpose uses such as community gathering on festive or special occasions, royal ceremonies, sports and entertainment and commercial activities during trading season. Propositions are based on their location, architectural specialties and antiquarian tidbits that were found in course of excavation. There are two such closed arenas. One, lying between citadel and middle town and being provided with two major gates, one on each on east and west, measured 283 m E-W and 45 to 47m N.S (ratio 6:1). It was also furnished with tiered, stepped or sloping stands on all four sides. For convenience, we may refer it as stadium or rather the great stadiums while the other one, far smaller is called the little stadium. The latter that was separated by massive stand from, but connected through an opening to, the former, lay right under the shadow of the pre-eminent castle onto which it abutted at the north-western corner. Both the stadia should have been used for some common as well as some separate function. To conclude, we may add that the great stadium is perhaps the largest in length while both are the earliest so far as archaeology has evidenced.

The other area in which the Harappans of Dholavira excelled spectacularly pertained to water harvesting with the aid of dams, drain, reservoirs and storm water management which eloquently speak of tremendous engineering skill of the builders. Equally important is the fact that all those features were integrated part of city planning and were surely the beauty aids, too, The Harappans created about sixteen or more reservoir of varying sizes and designs and arranged them in a series practically on all four sides. A cursory estimate indicates that the water structures and relevant and related activities accounts for 10 hectares of area, in other words

10% of the total area that the city appropriated within its outer fortification. The 13 m of gradient between high and low areas from east to west within the walls was ideally suited for creating cascading reservoirs which were separated from each other by enormous and broad bunds and yet connected through feeding drains.

Six of the water tanks, one to east of castle and five of the series to south of it, have been fully or considerably exposed while a few others or other related features are testified in check digs. It was found to be the largest, grandest and best-furnished reservoir of rectangular shape measuring 73.40 m N-S and 29.30 m E-W (ratio 5:2) at the top while above that there should have been a 1 to 1.20 m high embankment as evidenced at four corners. Its floor was excavated into three levels the deepest of which was 10.60 m as has been ascertained so far. At three corners, the north-western, north-eastern and south-western, it was provided with a flight of 30 steps each while at the fourth, there should be a waste-weir that still remains to be determined by more excavation. While the embankment served as a broad walkway on two sides, it was found to be a part of a wide causeway connecting it to the entrance appurtenances of the castle and, on the west, it should be flush with a 20 to 22 m promenade that lay between the castle wall and the reservoir. Inside the water structure there was found a rock cut well with a few rock cut steps and a stone-made enclosure of a later date. It is well-nigh presumable that some kind of tank was there right from Stage I. It should have been elaborated during Stage III. The present one was certainly a creation of Stage IV while during Stage V, it got damaged beyond repairs by the authorities – that, it become defunct forever. One thing is certain that it was accessible to all the city-dwellers whether living in citadel, middle town or lower town or even outsiders. Besides, it was, perhaps, by all on some social or religious occasions. It may also be added that it was created by partly excavated through the alluvium and partly by cutting the underlying rock and also that it was fed with the water from the Manhar largely.

Another five making a series outside along the south of the citadel have excavated fully or partly. These are of varying sizes and depth were cut into soft sedimentary sandy limestone and make two mega-units with a somewhat staggered disposition. The first two from the east form one unit and the rest the second centrally located tank exhibit genuinely a rock cut architecture of excellence both in beauty and skill and also surely in importance and use. Consisting of both inlying and outlying features, it has a deep basin, an obliquely oriented deeper trough inside, a surrounding freeboard, two masonry flight of steps, an inlet and another rock cut outlet channel, besides outside features like a wide terrace on the west, a massive levee on the east, a stairway ascending to the covered south gate of the castle, a working platform on the south, a passageway between walls, emanating from the north-eastern stairs. Running parallel to the defensive walls of the castle as well as the city, it is rectangular tank measuring 33.4 E-W and 8.90 to 9.45 m N-S while the upper lies at the depth of 5.90 m to 6.50 m and the lower one at 7.90 m below the ancient working level. In fact, the deeper level pertains to the trough that was cut in the eastern half of the general basin. It has measured 15.50 m long E-W and 5.65 m acoss with its vertical sides being 140 oblique to those of the main basin. The neatness with what the tank was cut is remarkable. The weaker veins of the rock

were scooped out and plugged with superb masonry work. The remaining two rock cut tanks lay further west. All the tanks were interconnected with drain conducting water into each other. The surplus water finally flowed out through a masonry drain into another series of reservoirs excavated further west. All these reservoirs like the eastern one became defunct sometime during Stage V.

The citadel has yielded an intricate network of storm water drains, all connected to an arterial one and furnished with slopes, steps, cascades, manholes (air ducts / water relief ducts), paved flooring and capstones. The main drains were high enough for a tall man to walk through easily. The rainwater collected through these drains was stored in yet another reservoir that was carved out in the western half of the bailey.

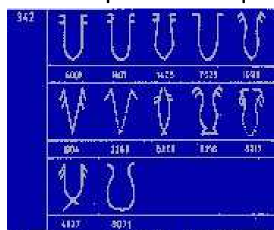
Besides, the city has yielded toilets, sullage jars, or sanitary pits. Drains have shown a good variety even included cut-stone ones and pottery pipes.
Like many amazing elements that Dholavira has yielded in respect of Indus civilization, another aspect of sepulchral architecture. The cemetery lies to the west of the city and covers a very large area. There are found a variety of cenotaphs which include regular rectangular and circular structures. So far as orientation is concerned, besides north – south, or northeast – southwest oriented structures, there are many which are east – west in longer axis which is certainly not Harappan in character. The most interesting are seven hemispherical constructions two of which were subjected to excavations. These were huge mud brick structures, having a circular plan and hemispherical elevation. While one was designed in the form of a spoked wheel, the other was without spokes. Both the structures were made over rock-cut chambers of large dimensions. Primarily, all sepulchral structures are devoid of skeletons although in most cases, they are furnished with grave goods mainly in the form of pottery. One of the hemispherical structures which has been exposed much, has yielded a necklace of steatite beads strung in a copper wire with a hook at either end, a gold bangle, beads in gold foil and other beads, besides specially made pottery. The hemispherical structures remind one of early Buddhist stupas. The kind of design that is of spoked wheel and unspoked wheel also remind one of the Sara-rata-chakra-citi and sapradhi-rata-chakra-citi mentioned in the Śatapatha Brahmana and Sulba-sutras.
However, there is a solitary example of a grave with skeleton, with a copper mirror in it.
Among smaller graves, there are cists, or cist in a cairn circle, or a circle or half-circle containing number of grave structures. Surely, the Harappans had a composite society having different ethnic / tribal communities following their own practices.
Dholavira has indeed added new dimensions to personality of Indus civilization and hold promise of yielding more given to more exposure sometime in the future.
http://asi.nic.in/asi_exca_2007_dholavira.asp
Rebus readings: Sarasvati hieroglyph compositions

http://www.scribd.com/doc/2359086/glypticelements is an ebook on: Orthographic elements in Sarasvati hieroglyptic compositions
http://sarasvati97.blogspot.com/2008/03/orthographic-elements-in-sarasvati.html

Orthographic elements in Sarasvati hieroglyptic compositions

The following orthographic analyses on specific examples of writing system are after Huntington, based principally on Huntington archives and Parpola pictorial corpus of inscriptions. The objective is to demonstrate that each one of the elements can be read rebus, and the Sarasvati hieroglyptic compositions explained in reference to mine-work/smithy/forge/mint working with minerals, metals, alloys. The pictorial motifs are so emphatic and precise, that they dominate the entire limited space offered by inscribed objects, thus relegating the 'signs' to a very small left-over space. Pictorial motifs are definitive messages complemented by the signs also as hieroglyphs.

The objective is to demonstrate that each one of the orthographic elements identified from epigraphs of Sarasvati civilization, can be read rebus in mleccha speech, and the Sarasvati hieroglyptic compositions explained in reference to mine-work/smithy/forge/mint working with minerals, metals, alloys. The pictorial motifs are so emphatic and precise, that they dominate the entire limited space offered by inscribed objects, thus relegating the 'signs' to a very small left-over space. Pictorial motifs are definitive messages complemented by the signs also as hieroglyphs.



Major sign on composition containing 'signs': Glyph of 'rim of jar' kan.d.a kan-ka **rebus: khan.n.a** = that which is dug (Pkt.lex.) **khana** = a trench, a pit, a hollow in the ground (Santali.lex.) [**khan** = a mine (Santali) ?khani = mine (VarBr.S.); khan.i = mine (Pkt.); khani (A.); khan (H.); khan. = mine, quarry (M.)(CDIAL 3813); cf. khana = a trench, a pit, a hollow in the ground (Santali.lex.)]. Kan.d. 'fire-altar, furnace'.

Many animals are shown with a manger, feeding trough in front. The feeding trough is the common glyph in these compositions.

dhangar 'feeding trough just enough to feed one animal'; rebus: dhangar 'smith'

sal = Indian Gaur, *Bos Gaurus* (or, *Gavaeus Gaurus*). Rebus : *sal* = v. open a smithy, work a smithy; open a beer-shop, a sugar-cane press*; ale manjhi tolare kamarko sal akata* = the blacksmiths have a smithy in that part of the village where our headman has his house; *teken kamarko sal akata* = the blacksmiths are working to-day (have started their forge)(Santali.lex.Bodding)

The orthographic components of the glyphs may be seen as : 1. overflow (water); 2. buffalo horn; 3. pot; 4. kneeling (position); 5. person. The cuneiform text explains the owner of the cylinder seal to be a scribe.

The lexemes are: lo 'to overflow'; tatta_ru (buffalo horn); man.d.i 'pot'; man.d.i 'kneeling'; man.d.i 'person'.

Homonyms (Rebus) are: loa 'iron'; �ha�hero 'brass worker'; man.di 'brass utensil', 'assembly, company', 'warehouse'. (**man.d.a_** = warehouse, workshop (Kon.lex.)

The seal, thus connotes a metal worker who makes brass utensils in an assembly (of metal workers). So<usi-mAr>(L) {N} ``a ^mischievous man''. |<mAr>\<mAnDra> `person'. |<mAr>\<mAnDra> `man'. ***Ka.*** **mandi, mande** persons, people. ***Tu.*** **mandi, mandè** id. ***Te.*** **mandi** crowd, collection of persons; retinue, following, infantry. ***Kol.*** (SR.) **mandī** men; (Kin.) **mandi** man. ***Pe.*** **mandanakar, madanakar** people belonging to the same side or party(DEDR 4700). Go<manda>(Z) [manda] {N} ``^group''. *Des.<manda>(G),<ma~da> `crowd, flock, herd'.

<mAnDi>//<m+n>(Z) {N} ``a brass ^utensil''. #45031.

Glyph: *mandar.i, mandar.ia* 'a drummer, drum musicians' (Santali)

Go<manDi>(ZA) {NB} ``^knee''. *Des.<maNDi>(GM) `knee'.
Gu<ma~Di>,,<manDi>(R4) {NB} ``^knee''. *Des.<maNDi>(GM).

Ta. **ma��i kneeling**, **kneeling** on one knee as an archer. ***Ma.*** **ma��uka** to be seated on the heels. ***Ka.*** **ma��i** what is bent, the knee. ***Tu.*** **ma��i** knee. ***Te.*** **ma��&ibrevmacr; kneeling** on one knee. ***Pa.*** **ma�tel** knee; **ma�i ku�tel kneeling** position. ***Go.*** (L.) **me��ā**, (G. Mu. Ma.) **min�a** knee (***Voc.*** 2827). ***Kon�a*** (BB) **me�a, me��a** id. ***Pe.*** **men�a** id. ***Man�.*** **men�e** id. ***Kui*** **men�a** id. ***Kuwi*** (F.) **menda**, (S. Su. P.) **men�a**, (Isr.) **me��a** id. Cf. 4645 Ta. **ma�a�ku (ma�i-forms)**. / ? Cf. Skt. **ma��ūkī-** part of an elephant's hind leg; Mar. **me�** knee-joint. (DEDR 4677).

Ta. **ma��u** hall of assembly, golden hall of Chidambaram, court of justice, arbitration court, cow-stall, herd of cows, raised platform under a tree for village meet- ings, centre of a garden, junction of four roads or streets; **ma��am** hall, assembly, court, meeting place under a tree in a village, open space used for riding horses, plain, open space, central place in a battlefield, Chidam- baram, house, cowshed, long street; **ma��al** marriage, long street; **ma��a�** Śiva; **ma��-il** courtyard of a house; **ma��u (ma��i-)** to fine, punish. ***Ma.*** **mannu** place of judgement or assembly; **mannam** standing place, place of judgment or discussion. ***Ko.*** **man�** Toda mund (i.e. village); burning place for dry funeral; **mandm (*obl.* mandt-)** meeting. ***To.*** **mo� (*obl.* mo�t-)** locus of tribal activity, including village with dairy, dairy apart from village, and funeral place; patrilineal clan. ***Ka.*** **mandu** hamlet of the Todas on the Nilagiri. ***Ko�.*** **mandï** village green. (DEDR 4777). (*a*) ***Ta.*** **mantai** flock, herd, common pasture of a village, open space in the middle of a village common to the community. ***Ka.*** **mandi, mande** flock of sheep or goats, herd of cattle or buffaloes, open place in the jungle or near a village where a flock or herd stands, pen, fold. ***Te.*** **manda** flock, herd, drove, pack, (B. also) place where flocks or herds are kept outside a village, hamlet inhabited by herdsmen. ***Pa.*** **manda** herd, flock; company, association. ***Go.*** (F-H. Ma. S.) **manda** herd, flock (***Voc.*** 2704). ***Kon�a*** **manda** herd. ***Kuwi*** (Isr.) **manda** herd, flock. (*b*) ***Ka.*** **mandi, mande** persons, people. ***Tu.*** **mandi, mandè** id. ***Te.*** **mandi** crowd, collection of persons; retinue, following, infantry. ***Kol.*** (SR.) **mandī** men; (Kin.)

mandi man. ***Pe.*** **mandanakar, madanakar** people belonging to the same side or party. (DEDR 4700).

ma��apa— m.n. 'open temporary shed, pavilion' Hariv., *°pikā—* f. 'small pavilion, customs house' Kād. 2. **ma��apa—** m.n. lex. 3. ***ma��haka—.** [Variation of �� with �� supports supposition of non—Aryan origin in Wackernagel AiGr ii 2, 212: see EWA ii 557. — Prob. of same origin as ma�ha—1 and ma��a—6 with which NIA. words largely collide in meaning and form] 1. Pa. *ma��apa—* m. 'temporary shed for festive occasions'; Pk. *maṁ�ava—* m. 'temporary erection, booth covered with creepers', *°viā—* f. 'small do.'; Phal. *ma��au* m. 'wooden gallery outside a house'; K. *man�av* m. 'a kind of house found in forest villages'; S. *manahũ* m. 'shed, thatched roof'; Ku. *mã�yā*, *manyā* 'resthouse'; N. *kā�hmã�au* 'the city of Kathmandu' (*kā�h—* < kā��há—); Or. *ma��uā̃* 'raised and shaded pavilion', *pa�ā—ma��oi* 'pavilion laid over with planks below roof', *mu��oi*, *°�ei* 'raised unroofed platform'; Bi. *mã�o* 'roof of betel plantation', *mã�uā*, *ma�°*, *malwā* 'lean—to thatch against a wall', *ma�aī* 'watcher's shed on ground without platform'; Mth. *mā�ab* 'roof of betel plantation', *ma�wā* 'open erection in courtyard for festive occa- sions'; OAw. *māṁ�ava* m. 'wedding canopy'; H. *mã�wā* m., *°wī* f., *ma��wā* m., *°wī* f. 'arbour, temporary erection, pavilion', OMarw. *maṁ�avo*, *mā�hivo* m.; G. *mã�av* m. 'thatched open shed', *mã�v�* m. 'booth', *mã�vī* f. 'slightly raised platform before door of a house, customs house', *mã�aviy�* m. 'member of bride's party'; M. *mã�av* m. 'pavilion for festivals', *mã�vī* f. 'small canopy over an idol'; Si. *ma�u—va* 'hut', *ma�a* 'open hall' SigGr ii 452. 2. Ko. *māṁ�av* 'open pavilion'. 3. H. *mã�hā*, *mā�hā*, *mã�hā* m. 'temporary shed, arbour' (cf. OMarw. *mā�hivo* in 1); — Ku. *mã�ā* m.pl. 'shed, resthouse' (or < ma��a—6?] *chāyāma��apa—. Addenda: **ma��apa—:** S.kcch. *mā��hvo* m. 'booth, canopy'. (CDIAL 9740).

Mu. *gaja maND* `cooked rice beginning to spoil'.

Kon�a **ma��i** earthen pan, a covering dish. ***Pe.*** **man�i** cooking pot. ***Kui*** **man�i** brass bowl. ***Kuwi*** (S.) **mandi** basin; (Isr.) **ma��i** plate, bowl. (DEDR 5678). Cf. 4682 Ta. **ma��ai**. (DEDR 4678). ***Ta.*** **ma��ai** mendicant's begging bowl, earthen vessel, head, skull, cranium, brain- pan, top portion as of palms, a standard of measure. ***Ma.*** **ma��a** skull; similar objects. ***Ko.*** **ma��** head. ***To.*** **ma�** id. ***Ka.*** **ma��e** id.; (Hav.) **ma��age** a big jar. ***Ko�.*** **ma��e** head. ***Tu.*** **ma��è** large earthen vessel, skull, head. ***Kor.*** (M.) **ma��a**, (O. T.) **man�e** head. Cf. 4678 Kon�a **ma��i**. / Cf. Skt. (*lex.*) **ma��a-** head.(DEDR 4682).

Vikalpa: mer.ha 'turned buffalo horns'; **mer.go** adj. rimless (vessels); having horns twisted backwards,buffalo) (Santali) rebus: med.h 'iron'; mer.h 'chief'.

Vikalpa: **d.abe, d.abea** 'large horns, with a sweeping upward curve, applied to buffaloes'; d.abea kad.a = a buffalo with large curved horns; d.abe deren = horns as described (Santali) Buffalo (wide horns): *d.abe, d.abea* wide horns; *d.ab, d.himba, d.hompo* 'lump (ingot?)' (Santali);

Glyphs surrounding the seated yogin.

Yogi in penance. Kamad.ha ‘penance’ (Pkt.); rebus: kampat.t.am ‘mint’ kamad.ha, kamat.ha, kamad.haka, kamad.haga, kamad.haya = a type of penance (Pkt.lex.) Rebus: kamat.amu, kammat.amu = portable furnace for melting precious metals (Te.) kampat.t.am = mint (Ta.) kammat.i_d.u = a goldsmith, a silversmith (Te.) kampat.t.tam coinage coin (Ta.); *kammat.t.am kammit.t.am* coinage, mint (Ma.); *kammat.a* id.; *kammat.i* a coiner (Ka.)(DEDR 1236)

Glyph elements in composition:

Elephant: ib(ha) ‘elephant’; rebus: ib ‘iron’
Body of human rebus: man.d.ua ‘booth, shed’ Glyph: *mandar* ‘the headman of a village’; *man.d.wari* ‘the Marwari caste of hindus’ ***Ko.*** **man[illegible]** Toda mund (i.e. village); burning place for dry funeral; **mandm (*obl.* mandt-)** meeting. ***To.*** **mo[illegible] (*obl.* mo[illegible]t-)** locus of tribal activity, including village with dairy, dairy apart from village, and funeral place; patrilineal clan. ***Ka.*** **mandu** hamlet of the Todas on the Nilagiri. ***Ko[illegible].*** **mandï** village green; ***Ta.*** **ma[illegible][illegible]u** hall of assembly, golden hall of Chidambaram, court of justice, arbitration court, cow-stall, herd of cows, raised platform under a tree for village meetings, centre of a garden, junction of four roads or streets (DEDR 4777).
Vikalpa glyph: (see the tail on composite animal orthographed like a snake.) **mod.avum** = to twist, to turn, to bend (G.lex.) **mon.d.** = the tail of a serpent; jambr.o mon.d. = the tail of the rock snake (Santali.lex.)

mor.a_ = wicker stool (B.Or.); mod.a_ (M.); mura_ (A.); mor.ha_ (H.); mor.ha_, mur.a_ (N.)(CDIAL 10352) [Note the stool or platform on which a seated person in yogic posture is shown]. .); Rebus: **mo_di_** (M.H.); a granary (Ka.lex.)

Leaping tiger Glyph: *ur-ukku* to jump, leap over (Ta.); *uRk* to run away (Kond.a); *urk* to dance (Kuwi)(DEDR 713). Rebus: *urukku* steel, anything melted, product of liquefaction (Ta.); *urukku* what is melted, fused metal, steel (Ma.); *uk* steel (Ko.); *urku, ukku* id. (Ka.)(DEDR 661). Tiger. Kol ‘tiger’; rebus: kol ‘pancaloha, forge’.

Two antelopes looking backwards mr..eka ‘goat’; rebus: milakkhu ‘copper’; krammara ‘look backwards’ rebus: kamar ‘smith’.
Two ricks (haystacks), stool/platform **pan~ja** = heap, pile (Pali.lex.) **pagar** = a heap of corn; pagor = a heap of ears of corn, made to separate the grain from the husk (G.lex.) pasra ‘smith’s forge’.

Water-buffalo ra~_go buffalo bull (Ku.N.)(CDIAL 10559). ra_ngo = buffalo (Santali); kuranga = antelope (Sanskrit); ran:ku = antelope (Santali) ran:ku = tin (Santali)

Rhinoceros badhia = castrated boar (Santali) Gu<badia> {N} ``^boar''.
*Des.<baria>(M) `pig(G), boar(M)'. bar.ea ‘merchant’; badhi ‘work in wood and iron’

Faces mukha ‘face’; rebus: mu~h ‘ingot’
Tiger’s mane cu_l.a ‘tiger’s mane’; cu_l.ai ‘kiln’.

Bangles on hands **cur.i** a bracelet, a bangle (Santali) rebus: **cu_l.ai**, 'kiln' (Ta.) **culli** = a fireplace (Ka.)
Waistband kamarsa_la 'waistband'; rebus: kamar 'smith'; sala 'workshop'
Buffalo horns tatta_ru (buffalo horn); rebus: �ha�hero 'brass worker'
Twig The twig ligatured to the buffalo horn: **man.d.a** = a branch; a twig (Te.lex.) rebus: **man.d.a_** = warehouse, workshop (Kon.lex.) So<tAttARu>(L) {N} ``^buffalo horn''. ***Ta.*** **tutt&abrevmacr;ri** a kind of bugle-**horn**. ***Ma.*** **tuttāri horn**, trumpet. ***Ka.*** **tutūri, tuttāri, tuttūri** a long trumpet. ***Tu.*** **tuttāri, tuttūri** trumpet, **horn**, pipe. ***Te.*** **tutārā** a kind of trumpet. / Cf. Mar. **tutārī** a wind instrument, a sort of **horn**. (DEDR 3316). Rebus: ***�ha��hakāra—** 'brass worker'. 2. ***�ha��hakara—.** [*�ha��ha—1, kāra—1] 1. Pk. *�ha��hāra—* m., K. *�hõdotdot;�hur* m., S. *�hã�hāro* m., P. *�ha�hiār*, *°rā* m. 2. P. ludh. *�ha�herā* m., Ku. *�ha�hero* m., N. *�ha�ero*, Bi. *�ha�herā*, Mth. *�ha�heri*, H. *�ha�herā* m. (CDIAL 5493). ***�ha��h—** 'strike'. [Onom.?] N. *�ha�āunu* 'to strike, beat', *�ha�āi* 'striking', *�ha�āk—�hu�uk* 'noise of beating'; H. *�ha�hānā* 'to beat', *�ha�hāī* f. 'noise of beating'.(CDIAL 5490). ***�ha��ha—** 1 'brass'. [Onom. from noise of hammering brass? — *�ha��h—] N. *�ha��ar* 'an alloy of copper and bell metal'.(CDIAL 5491).
Ta. **ta��u (ta��i-)** to knock, tap, pat, strike against, dash against, strike, beat, hammer, thresh; ***n.*** knocking, patting, break- ing, striking against, collision; **ta��am** clapping of the hands; **ta��al** knocking, striking, clap- ping, tapping, beating time; **ta��ā�** gold or silver **smith**; *fem.* **ta��ātti.** ***Ma.*** **ta��u** a blow, knock; **ta��uka** to tap, dash, hit, strike against, knock; **ta��ān** gold**smith**; ***fem.*** **ta��ātti; ta��āran** washerman; **ta��ikka** to cause to hit; **ta��ippu** beating. ***Ko.*** **ta�- (tac-)** to pat, strike, kill, (curse) affects, sharpen, disregard (words); **ta� �- (c)** to stagger from fatigue. ***To.*** **to�** a slap; **to�- (to�y-)** to strike (with hammer), pat, (sin) strikes; **to�- (to�-)** to bump foot; **to�xn, to�xïn** gold**smith**; ***fem.*** **to�ty, to�xity; to�k ïn- (i�-)** to be tired, exhausted. ***Ka.*** **ta��u** to tap, touch, come close, pat, strike, beat, clap, slap, knock, clap on a thing (as cowdung on a wall), drive, beat off or back, remove; ***n.*** slap or pat, blow, blow or knock of disease, danger, death, fatigue, exhaustion. ***Ko�.*** **ta��- (ta��i-)** to touch, pat, ward off, strike off, (curse) effects; **ta��ë** gold**smith**; ***fem.*** **ta��ati** (Shan- mugam). ***Tu.*** **ta��āvuni** to cause to hit, strike. ***Te.*** **ta��u** to strike, beat, knock, pat, clap, slap; ***n.*** stripe, welt; **ta�ravãmacr;�u** gold**smith** or silver**smith**. ***Kur.*** **ta�nā (ta�cas)** to flog, lash, whip. ***Malt.*** **ta�ce** to slap. Cf. 3156 Ka. **tā�u**. / Cf. Turner, *CDIAL*, no. 5490, ***�ha��h-** to strike; no. 5493, ***�ha��hakāra-** brassworker; &root; **ta�**, no. 5748, **támacr;�a-** a blow; no. 5752, **tā�áyati** strikes. (DEDR 3039).

Fanshaped headdress (adorned person) **maNDitR** mfn. adorning, one who adorns (= ornament) Ba1lar. Rebus: mand.a_ 'workshop'.





m0304 m304 inverted, reversed black and white, restored. To present the full effect, Huntington presents a restored view of the seal. The platform is resting on two stacks of hay (?) on either side of two antelopes looking backwards.

Ibex. *kala* stag, buck (Ma.); *kal a.r.* Nilgiri ibex (Ko.); *kalai* stag, buck, male black monkey (Ta.); *kalan:kompu* stag's horn (Ta.)(DEDR 1312) rebus: kol 'pancaloha'. Vikalpa: kalavai 'mixing (alloying)'.



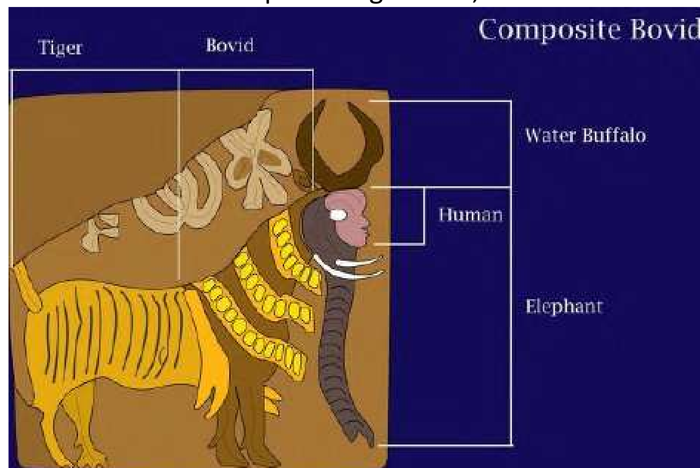


Elements of the composition: human figure, elephant, tiger, rhinoceros, water buffalo; two ibexes below human's platform (one ibex missing due to damage to seal). Twig or sprout in fanshaped headgear.

Elements in m304 face: two profile faces, bovine ears. Probable bristles like the bristles on a tiger's mane. The face profiles do not match with other faces profiled on other inscribed objects. The profiles of two faces however, can be compared the profile of human face shown on this seal of a composite animal (elements: human, tiger, tiger's mane, markhor horns).

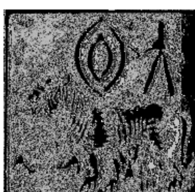


m304 torso is enveloped in a garment, with ties around the waist of the figure. There is nothing ithyphallic in this orthography of a human adorned with bangles on the arms upto the shoulders and wearing jewellery shown on the chest.



The key question is: how does the central figure relate to the animals and a standing human (betwixt an elephant and a leaping tiger) surrounding the figure.

Composition of bovid on m299. Many component elements of this composition also are included in the composite animal: human (face), tiger, elephant, water-buffalo, bovine legs, tail with three strokes and neck-rings (comparable to the rings on the neck of the heifer?).

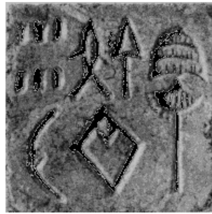
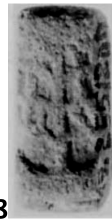

h094

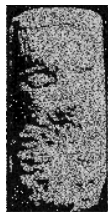

h088

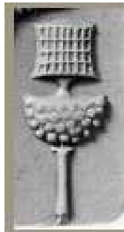

m0238


h076

Manger or feed trough in front of animals.

**h010a** **h098** **h195A** **h195B**

**h196A** **h196B** **Part of a gold fillet**

   random selection of variant standards: h006, Parpola unkn, m018, h087

**Standard after Hargreves**

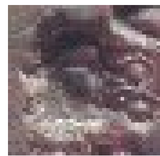
Standard in front of heifer. Dotted circles depicted on standard: **kandhi** = a lump, a piece (Santali.lex.) [The dotted circle thus connotes an ingot taken out of a **kan.d.i**, furnace]. **ka_ndavika** = a baker; kandu = an iron plate or pan for baking cakes etc. (Ka.lex.) Vikalpa: khangar khongor 'holes'; rebus: kangar 'furnace, portable furnace'.



h176 inverted view



Parpola h176 and inverted B&W version (Gaur, standing human, wide-mouthed-rimless pot, head with hairbuns , house, home(?) The head with hairbuns can be compared with the head shown on seal M-1186 in front of the kneeling human.







loa 'fig' (Munda)

Rebus: Re<lua>(B),,<loa>(B) {N} ``^iron''. Pl. <-le>.

The elements in composition on seal (M 1186): Set 1: composite animal with bovine body, human head and markhor horns. Set 2: Kneeling person with horns and twigs on headdress. Set 3: horned human in tree (perhaps also wearing twigs or ficus on headdress); the tree shaped like a wide-mouthed-rimless-pot, has six fig leaves emanating from the branches. The kneeling person is comparable to the person standing within the tree. The tree is ficus religiosa (bodhi). Human wears bangles, ladder-like head scarf. Has water-buffalo (?) horns and a ficus spouting from the top of his head.







Elements of composite animal: bovine body with a ruff neck, a human face, markhor horns. It is NOT a pas'u waiting to be sacrificed. Huntington notes that it acts as 'supporter or a "second" in the supplication."



Six heads of animals. Tiger and 5 bovines emanating from a core. M417 Parpola
Parpola M-298 Country: India

Two heads on bull composite. Fish on the field, above.



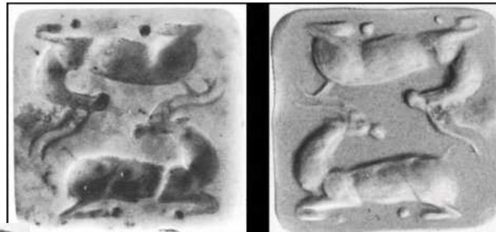
Mohenjodaro: three-headed bull seal



Monument: seal with interlinked animal, or multi-headed animal, design



Three bovine heads on a single body (Parpola K043)

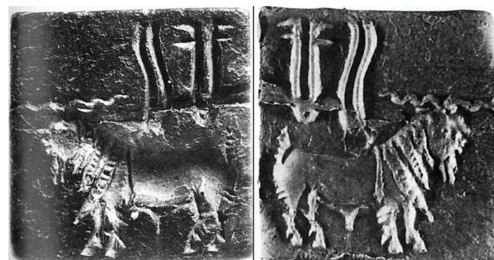


Chinkara 'Indian gazelle' shown on a seal.



Markhor with human face (Parpola) m1179

Ibex, (Parpola) L-048





Markhor (Parpola) X-B 009. *Capra falconeri heptneri*

Gharial (Parpola) MD-602; large boat with double rudder and central









superstructure.
tiger + ligatures (Parpola) K-05

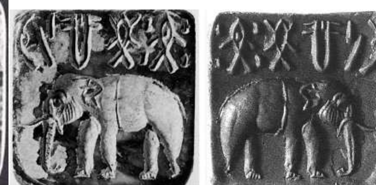




Tiger + horn (zebu) m-7 (Parpola)
Tiger (Parpola) H94

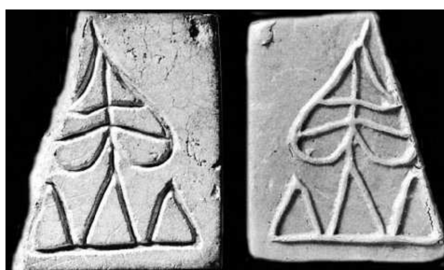
Indian rhinoceros (Parpola) h088
Asian elephant, h089 (Parpola)





Water buffalo, b007 (Parpola)

Gaur (bos gaurus) on seal, m0238A (Parpola)

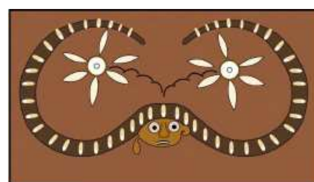






Kot-diji potsherd from a burial vessel. Ficus leaves and radiating dotted circle.





Dam Sadat/Quetta. Burial vessel. Two (?) bos indicus (zebu) facing each other.

Kot Diji burial vessel. Human face illustrated with water buffalo horns and foliate (?) motifs.





Heifer (Parpola h006)



Subject of Photo: bull sealing



Monument: script seal

Monument: animal seal (tiger)





Monument: script seal

Monument: bull seal







Monument: seal with bull design

Monument: bos indicus seal



Subject of Photo: carved seal showing animals, swastika, tree

Svastika seal





Monument: script seal
Subject of Photo: script seal

Scan Number: 0052379
http://huntington.wmc.ohio-state.edu/public/index.cfm?fuseaction=showThisDetail&ObjectID=25001540&detail=large



Monument: script seal



Monument: script seal



Monument: bull seal



Huntington calls this Monument: sacrfice seal (There are orthographic elements each of which can be read rebus)>

Monument: "bull sealing" amulet







Subject of Photo: bull seal

Monument: bos indicus seal
Alternate Name: seal showing bull



Subject of Photo: seal depicting yogin figure and animal (horse?)



Subject of Photo: seal carved with characters and animal form





Monument: carved seal (Orthographic elements: 6 or 7 humans on top register; kneeling person, markhor in front, horned person within ficus leaf-defcorated wide-mouthed-rimless pot.)



Monument: carved seal showing figure in ceremonial headdress within a tree or flaming pillar



Monument: carved seal showing figure in ceremonial headdress within a tree or flaming pillar



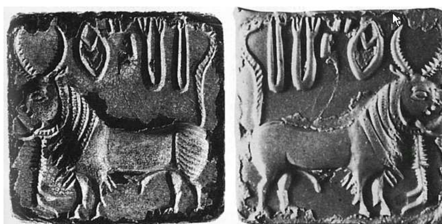
Monument: carved seal showing "master of animals" motif

Monument: carved seal showing animals and yogin in headstand position




.

Monument: seal with bovine creature



Animal
(Parpola m299)



Monument: carved seal showing composite creatures and tree

Composite animal (Parpola) m1177
Composite animal (Parpola) h096



composite

Monument: carved seal showing a bull





Monument: carved seal showing a yogin (left), bull (center), figure with yogin headdress in tree (right)









Monument: seal showing yogin

Monument: seal showing a bull

Monument: seal showing a bull and manger

Site Name: Kot Diji
Monument: pot with painted horned animal design



Monument: carved seal showing animals and characters

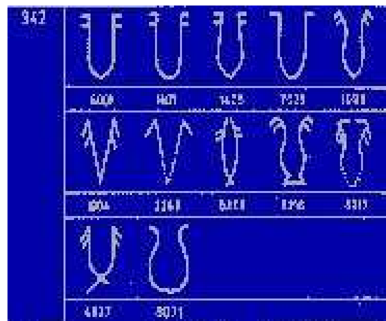


Monument: seal with "unicorn" design



Olaf Sprenger's collection (Personal communication, 27 March 2008) includes a Sarasvati civilization seal with an epigraph. The 'unicorn' glyph is authentic because the traces/outline of pannier on the front shoulder is clearly visible. There are instances of the depiction of the standard device in variant forms including a sharp gimlet (of a lathe) type ending on top portion of the device. Material used for the seal, Baked Steatite, and size 2.5 x 2.5 cm are also comparable with the Indus script corpus.

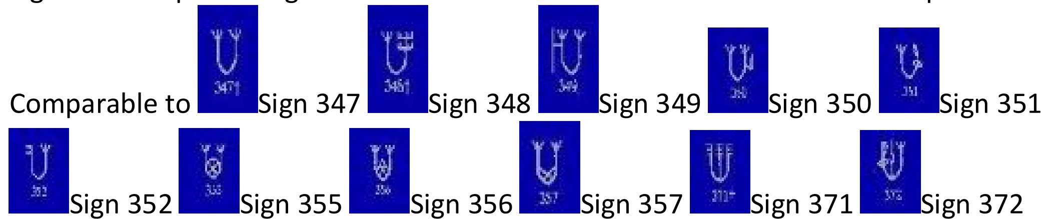
The first three signs read from left to right are comparable to the following sign/variant-lists of Indus script (which I have called Sarasvati hieroglyphs) (The fourth, perhaps two short-linear strokes, is illegible):



Sign 1: comparable to Sign 342 and variants. Sign 342 is the most frequently-occurring 'sign' on the corpus of inscribed objects.

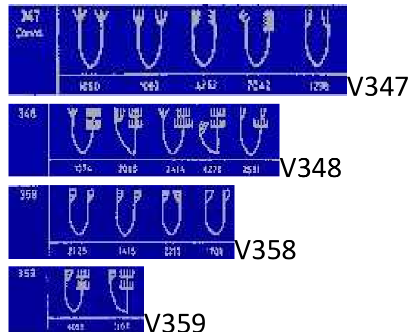
Major sign on composition containing 'signs': Glyph of 'rim of jar' kan.d.a kan-ka **rebus: khan.n.a** = that which is dug (Pkt.lex.) **khana** = a trench, a pit, a hollow in the ground (Santali.lex.) [**khan** = a mine (Santali) ?khani = mine (VarBr.S.); khan.i = mine (Pkt.); khani (A.); khan (H.); khan. = mine, quarry (M.)(CDIAL 3813); cf. khana = a trench, a pit, a hollow in the ground (Santali.lex.)]. Kan.d. 'fire-altar, furnace'. The glyph, thus connotes a furnace at the mouth of a mine, perhaps of copper. The word kan- in Tamil means 'copper'.

Sign 2: A rice-plant is ligatured on either-end of the wide-mouthed-rimless-pot.



Comparable to Sign 347 Sign 348 Sign 349 Sign 350 Sign 351 Sign 352 Sign 355 Sign 356 Sign 357 Sign 371 Sign 372

Variants:



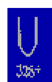
V347 V348 V358 V359

The ligaturing element of 'rice-plant' in Sign 347 can be compared with the glyphs shown on the seal m1123 (Mohenjodaro seal).

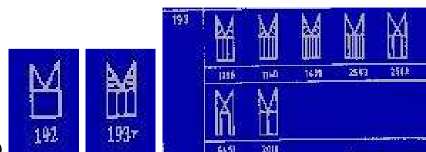


m1123 kolma hor.o ' a variety of rice plant' (Santali.lex.) kolame 'furnace, smithy, forge' (Ka.)

The rice-plant glyph is paired in the ligatured Sign 347. The pairing may be explained by Vikalpa (alternative possibility): OSi. *do*, *de*, Si. *deka*, Md. *de.*Skt. dva— 'two': m. *dvaú* (*duvaú*), *dvā̃* (*duvā̃*), f.n. *dvē̃* (*duvē̃*) RV. Pa. (CDIAL 6648). Rebus: deko 'hindu'. Thus, deka 'two'; rebus: deko 'hindu'. The ligatured Sign 347 can thus be read as: deka kolma; rebus: hindu furnace.



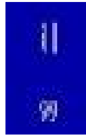
bat.i = rimless vessel. Rebus: bhat.i 'smelter furnace'. Vikalpa (alternative): mer.go 'rimless vessels'; rebus: med. 'iron'. If the kolma 'rice-plant' is seen as ligatured to a rimless vessel, the combined ligatured glyph can be read as: deka kolma bat.i; rebus: hindu furnace, smelter furnace.

Sign 3: comparable to  Variants of Sign193

Glyph: *ba_ran.um* [Hem. Des. *ba_r, dva_r*, fr. Skt. *dva_ra*] a door, a gate, an entrance; the court-yard in front of a house; *ba_r* a door (G.) *ba_r* a courtyard in

front of a house (G.) Rebus: **bharan** = to spread or bring out from a kiln (P.lex.) **bha_ran.** = to bring out from a kiln (G.) **ba_ran.iyo** = one whose profession it is to sift ashes or dust in a goldsmith's workshop (G.lex.) bharant (lit. bearing) is used in the plural in Pan~cavim.s'a Bra_hman.a (18.10.8). Sa_yan.a interprets this as 'the warrior caste' (bharata_m – **bharan.am kurvata_m ks.atriya_n.a_m**). *Weber notes this as a reference to the Bharata-s. (*Indische Studien*, 10.28.n.2) Vikalpa (alternative): **bar.ea 'merchant'**

The last illegible sign (perhaps, 'two short linear strokes'). Could be a phonetic determinant of the preceding Sign (Sign 3 of Olaf Sprenger's seal or Sign 192).



If so, it can be read as 'two': bar, barea 'two'; rebus: bar.ea 'merchant'. Vikalpa (alternative): badhi = 'to ligature, to bandage, to splice, to join by successive rolls of a ligature' (Santali) **bata_** bamboo slips (Kur.); **bate** = thin slips of bamboo (Malt.)(DEDR 3917). Ligature! **badhi!** This becomes a characteristic feature of the orthography of epigraphs. Rebus: bad.hi 'professional carpenter' (B.)

Thus, the four signs together may connote:

Carpenter
Merchant
(possessing) hindu furnace, smelter furnace and smithy/forge (kolame); mine-pit furnace (kan.d. kan-ka)

The one-horned heifer + standard device:

damra = heifer, steer (Gujarati); tambra = copper (Kannada); tamba id. (Santali); tamra id. (Sanskrit) tibira = merchant (copper) (Akkadian)

kod. 'horn'; rebus: kod. 'workshop'

kamarsa_la 'pannier'; rebus: kamar 'smith' + sala 'workshop'

sangad.a 'gimlet, lathe, furnace'; rebus: janga_d.iyo 'military guard who accompanies treasure into the treasury'.

Thus, the seal depicts the possessions of a smith-merchant working with copper minerals, in a forge/metals-workshop.

Writing to encode mleccha speech



The one-horned heifer is a composite glyph containing a suite of hieroglyphs: components – heifer, one horn, rings on neck, pannier, gimlet-furnace standard device.
Excerpted from the following seal. The mleccha readings and mlecchita vikalpa rebus semantics are: damr.a 'heifer'; kod. 'horn'; kodiyum 'rings on neck'; pannier 'kamarsa_la'; sangad.a 'gimlet, lathe, portable furnace'

Rebus: tam(b)ra 'copper'; kod. 'workshop'; kamar 'smith' + sala 'workshop'; janga_d.iyo 'military guard who guard wealth taken for storage in the treasury'.



This seal from Mohenjo-daro measures 29 mm (1.14) inches on each side and is made of fired steatite. Steatite is an easily carved soft stone that becomes hard after firing. On the top are four "pictographs" of an as yet undeciphered Indus script, one of the very first writing systems in history.

Below is the well-known unicorn figure of Indus Valley culture. Whether it designates a real or mythical animal is also unknown. Beneath it is a "sacred object," which could have been anything from an animal's trough to an incense burner.



Side View of the Seal

It is one of 388 unicorn seals found during the excavations in Mohenjo-daro led by the Britih archaeologist Ernest Mackay between 1927 and 1931. Mackay dated the seal to the late Period IB, or approximately 2,000 BCE
http://www.harappa.com/seal/1.html
Gola Dhoro Seals |

Golo Dhoro being a very small site, we never expected to recover many Indus seals. To our great surprise the site has revealed five inscribed steatite seals with one horned animal - usually referred as unicorn, with a standard device engraved in front of it.

The backs have prominently projecting pierced boss. Seals of this type are common in urban Harappan sites and most probably they may have been used in trade and exchange transactions by the Harappans. Stamped impression of such seals on a clay/terracotta sealing have also been found in the excavation.

One of the steatite seals discovered this season has decorative linear patterns incised on three sides and a deep, scooped out rectangular socket-like cavity on the fourth side and originally it perhaps had a sliding lid to cover the socket. These are in addition to the usual engraved inscription and the unicorn figure on the seal and therefore it appears to be a unique one, since such seals with socket have not been reported from any other Harappan site so far.


Sealing and Seals

The gates of the fortification have been eluding us, but during last season's excavations we have been able to locate entrance to the fort on the southern side of the settlement. However during the next proposed excavation season, we would like to probe the eastern side of the fortification where we suspect that we may be able to find another entrance. Besides, we would like to reopen the shell working and stone bead making areas.


Unique Golo Dhoro Seal

Habitation at the site continued in the post-urban period too for another 200 years up to 1700 BCE. In the last phase there are indication that the trade activities and the production of various craft items, use of the fortification wall, writing and making steatite seals came to an abrupt end.

Archaeologists studying the manufacturing techniques and artistic styles of the modern artisans are begging to reconstruct how the ancient artisans produced these striking objects. They also study some relationship between these crafts and traditional trading practices in order to understand better the economic organization of the ancient cities and towns. By combining the results of these craft studies with similar information on subsistence, archaeologists are now beginning to better understand the Harappan civilization. The detailed analysis of the excavated data of Gola Dhoro is hoped to help archaeologist to better understand this unique and one of the earliest civilization of the world.
http://www.harappa.com/goladhoro/goladhorosealfind.html
Over time, people living in India have used many different writing systems. These systems were generally developed record down different types of information as the need arose.
The first Indian script, developed in the Indus Valley around 2600 B.C. is still undeciphered. Thus, it is still not possible to fully understand this civilization, as we have no readable records of their beliefs, history, rulers or literature.


Seal with Indus Valley script


Coin with Brahmi script



Later Indian scripts, like Brahmi and Kharosthi were developed to write both official and local languages. Great epics, royal inscriptions, religious texts and administrative documents were all written using these scripts. Through these sources we are able to learn about the literature, mythology, history and beliefs of ancient India.

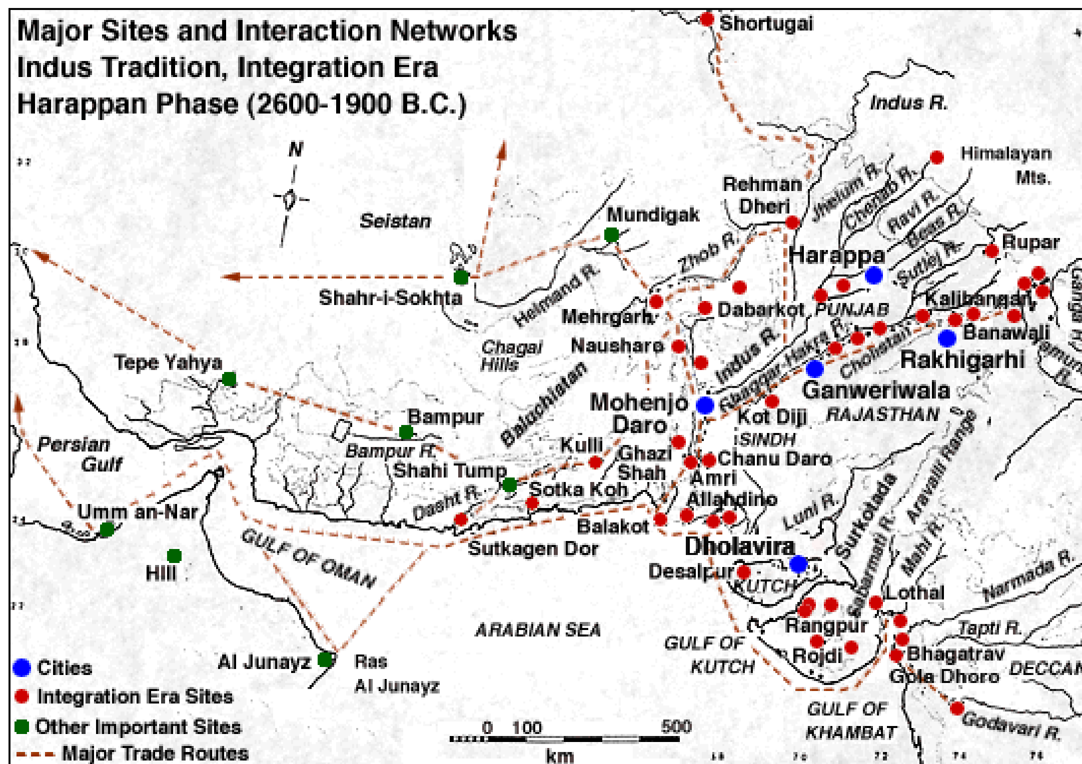

Fragment of an Ashokan pillar covered with Brahmi script

Writing and belief systems as well as oral traditions developed, some of which survive in one form or another to this day. Additionally, great works of art, architecture and epics demonstrate the richness of the enduring culture of this land.


The graphic design on the seal showing a fire-altar (+ glyph) and the four depressions shown in squares in four corners may denote a furnace and ingot-moulds.

The intricately carved seals of the Indus Civilization were probably used in trade. Typically square with each side measuring from two to five centimeters, the obverse of most seals was engraved with mythical scenes or animals and an average of five Indus script signs. The square seals also had a small boss on the back through which a string or a cord had been passed, allowing them to be worn or otherwise secured. While the Indus script remains undeciphered, approximately 400 signs have been identified thus far in what was probably a logo-syllabic writing system in which the signs were read from right to left.
http://www.ancientindia.co.uk/writing/home_set.html
http://www.globalheritagefund.org/where/indus_video.html

http://www.globalheritagefund.org/picasa/indus_heritage_album_player.html



Tree as a hieroglyph
-- Tree in mlecchita vikalpa (writing system of smiths)
Mirror: http://tinyurl.com/397kc7

Rebus: kut.i 'smelter furnace' (Santali)

Vikalpa: kut.i, kut.hi, kut.a, kut.ha a tree (Kaus'.); kud.a tree (Pkt.); kur.a_ tree; kar.ek tree, oak (Pas;.)(CDIAL 3228). kut.ha, kut.a (Ka.), kudal (Go.) kudar. (Go.) kut.ha_ra, kut.ha, kut.aka = a tree (Skt.lex.) kut., kurun: = stump of a tree (Bond.a); khut. = id. (Or.) kut.amu = a tree (Te.lex.)

The sacredness associated with the Sarasvati hieroglyphs is exemplified by the word **kole.l** in Kota which means: 'smithy, temple in Kota village'. When smithy is a temple, all devices associated with the smithy assume auspiciousness, become glyphs denoting wealth, hence, hieroglyphs. The 'tree' glyph is one such hieroglyph of ancient times in Sarasvati civilization.

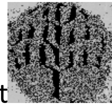
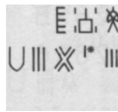


'Tree' Field Symbol 44 (Tree) 28 out of 34 occur at Harappa

 h352C Field Symbol 83 (Dotted circles) 57 out of 67 occur at Harappa

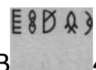


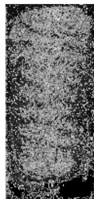
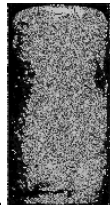
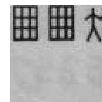
Slide 205 Faience tablet or standard. This unique mold-made faience tablet or standard (H2000-4483/2342-01) was found in the eroded levels west of the tablet workshop in Trench 54. On one side is a short inscription under a rectangular box filled with 24 dots. The reverse has a narrative scene with two bulls fighting under a thorny tree.

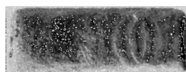
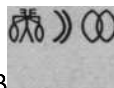
m0500atm0500bt2604 Pict-76: Tree, generally within a railing or on a platform.

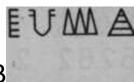


Pict-103 Horned (female with breasts hanging down?) person with a tail and bovine legs standing near a tree fisting a horned tiger rearing on its hindlegs. 1357

h183Ah183B4327 h184A

h184Bh185Ah185B 5279

h186Ah186B4329h187A

h187B5282 Pict-75: Tree, generally within a railing or on a platform.

h188A h188B

4325 h189A h189B 4341 Pict-126: Anchor?

h190A h190B 4323 h191A

h191B 4332 h192A h192B 5340

h193A h193B 5332 h194A

h194B h195A h195B h176A h176B


h176bb 4303 Tablet in bas-relief h176a Person standing at the centrebetween a two-tiered structure at R., and a short-horned bull (bison) standing near a trident-headed post at L. h176b

From R.—a tiger (?); a seated, pig-tailed person on a platform; flanked on either side by a person seated on a tree with a tiger, below, looking back. A hare (or goat?) is seen near the platform.

Pict-108 Person kneeling under a tree facing a tiger.

[*Chanhudaro Excavations*, Pl. LI, 18] 6118

m0309 Pict-109: Person with hair-bun seated on a tree branch; a tiger looks at the



person with its head turned backwards. 2522 m0310AC

1355



m0311 Pict-52: Composite motif: body of a tiger, a human body with bangles on arms, antelope horns, tree-branch and long pigtail. 2347

 m0478At  m0478Bt

 m0479At  m0479Bt 3224

 m0480At  m0480Bt Tablet in bas-relief. Side a: Tree Side b: Pict-111: From R.: A woman with outstretched arms
flanked by two men holding uprooted trees in their hands; a person seated on a tree with a tiger below with its head turned backwards; a tall jar with a lid.

Is the pictorial of a tall jar the Sign 342 with a lid? Sign45 seems to be a

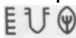
kneeling adorant offering a pot (Sign 328) 2815 Pict-77: Tree, generally

within a railing or on a platform. 3230

 m0481At  m0481Bt  m0481Ct

 m0481Et 2846 Pict-41: Serpent, partly reclining on a

low platform under a tree  m0482At m0482Bt



1620 Pict-65: Gharial, sometimes with a fish held in its jaw and/or surrounded by a school of fish.



m1186A 2430 Composition: horned person with a pigtail standing between the branches of a pipal tree; a low pedestal with offerings (? or human head?); a horned person kneeling in adoration; a ram with short tail and curling horns; a row of seven robed figures, with twigs on their pigtails. (ku_ti_ 'bunch of twigs')

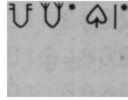
 m1430Bt  m1430C  m1430At Pict-101: Person throwing a spear at a buffalo and placing one foot on its head; three persons standing near a tree at the centre.



2819 Pict-60: Composite animal with the body of an ox and three heads [one each of one-horned bull (looking forward), antelope (looking backward) and

bison (looking downwards)] at right; a goat standing on its hindlegs and browsing from a tree at the center.


m1431A m1431B m1431C


m1431E 
2805 Row of animals in file (a one-horned bull, an elephant and a rhinoceros from right); a gharial with a fish held in its jaw above the animals; a bird (?) at right. Pict-116: From R.—a person holding a vessel; a woman with a platter (?); a kneeling person with a staff in his hands facing the woman; a goat with its forelegs on a platform under a tree. [Or, two antelopes flanking a tree on a platform, with one antelope looking backwards?]



A cylinder seal impression

“Impression of an Indus-style cylinder seal of unknown Near Eastern origin in the Musee du Louvre, Paris. One of the two anthropomorphic figures carved on this seal wears the horns of water buffalo while sitting on a throne with hoofed legs, surrounded by snakes, fishes and water buffaloes. Copyrighted photo by M. Chuzeville for the Departement des antiquites orientales, Musee du Louvre.” (Parpola, 2001Parpola, A. (1998). Asko Parpola;. Retrieved June 15, 2001: http://www.harappa.com/script/parpola0.html) The glyptic elements of this cylinder seal are: tree, heads of horned bulls ligatured to snakes, contending bulls face-to-face, rhinoceros, ram, eagle, fishes, circle, hoofed-stool, standing person with horns and plant adorning his head, a person holding back two rearing tigers with either hand outstretched with another tree nearby.




m1370a 2509 Cylinder seal; tree branch

Tree in front. Fish in front of and above a one-horned bull. Cylinder seal impression (IM 8028), Ur, Mesopotamia. White shell. 1.7 cm. High, dia. 0.9 cm. [Cf. Mitchell 1986 Indus and Gulf type seals from Ur: 280-1, no.8 and fig. 112; Shaikha Haya Ali Al Khalifa and Michael Rice, 1986, *Bahrain*




MS 4602 Indus Valley cylinder seal, ca. 3000 BCE depicting a palm tree and a man between two lions with wings and snakeheads, holding one arm around each, two long fish below, and one fish jumping after one lion’s tail or the tail of a

sitting monkey above it.

Seal matrix on creamy stone or shell, Indus Valley, Pakistan, ca. 3000 BC, 1 cylinder seal, diam. 2,0x3,7 cm, in fine execution influenced by the Jemdet Nasr style of Sumer.
Provenance: 1. Found in Mehrgarh, Pakistan; 2. The Waria Collection, Dadu, Pakistan (-2001).
Commentary: Similar fish can be found on Indus Valley pottery from the period and later
http://www.nb.no/baser/schoyen/5/5.6/index.html#4602


Kalibangan065a Kalibangan065A6

Kalibangan065E 8024 Pict-104: Composition: A tree; a person with a composite body of a human (female?) in the upper half and body of a tiger in the lower half, having horns, and a trident-like head-dress, facing a group of three persons consisting of a woman (?) in the middle flanked by two men on either side throwing a spear at each other (fencing?) over her head.


m0296 Two heads of one-horned bulls with neck-rings, joined end to end (to a standard device with two rings coming out of the top part?), under a stylized pipal tree with nine leaves. 1387

Harappa. Planoconvex molded tablet found on Mound ET. A. Reverse. a female deity battling two tigers and standing above an elephant and below a six-spoked wheel; b. Obverse. A person spearing with a barbed spear a buffalo in front of a seated horned deity wearing bangles and with a plumed headdress. The person presses his foot down the buffalo's head. An alligator with a narrow snout is on the top register. "We have found two other broken tablets at Harappa that appear to have been made from the same mold that was used to create the scene of a deity battling two tigers and standing above an elephant. One was found in a room located on the southern slope of Mount ET in 1996 and another example comes from excavations on Mound F in the 1930s. However, the flat obverse of both of these broken tablets does not show the spearing of a buffalo, rather it depicts the more well-known scene showing a tiger looking back over its shoulder at a person sitting on the branch of a tree. Several other flat or twisted rectangular terracotta tablets found at Harappa combine these two narrative scenes of a figure strangling two tigers on one side of a tablet, and the tiger looking back over its shoulder at a figure in a tree on the other side." [JM Kenoyer, 1998, p. 115].



Inscribed objects from Harappa 2000-2001 (Jonathan Mark Kenoyer and Richard H. Meadow)

Slide 185 Molded terracotta tablet (H2001-5075/2922-01) with a narrative scene of a man in a tree with a tiger looking back over its shoulder. The tablet, found in the Trench 54 area on the west side of Mound E, is broken, but was made with the same



mold as ones found on the eastern side of Mound E and also in other parts of the site (see slide 89 for the right hand portion of the same scene). The reverse of the same molded terra cotta tablet shows a deity grappling with two tigers and standing above an elephant (see slide 90 for a clearer example from the same mold). Slide 90
Rebus erka = ekke (Tbh. of arka) aka (Tbh. of arka) copper (metal); crystal (Ka.lex.) cf. eruvai = copper (Ta.lex.) eraka, er-aka = any metal infusion (Ka.Tu.) eruvai 'copper' (Ta.); ere dark red (Ka.)(DEDR 446). Ka. e?e to pour any liquids, cast (as metal); n. pouring; e?acu, ercu to scoop, sprinkle, scatter, strew, sow; e?aka, **eraka** any metal infusion; molten state, fusion. Tu. **eraka** molten, cast (as metal); eraguni to melt. (DEDR 866).

Vikalpa: **erga = act of clearing jungle (Kui)**



Vikalpa: Spy on a tree, seated like a kaulo 'smith'. Tree is kut.i rebus for vikalpa kut.hi 'smelter furnace'. What is it a furnace for? Rebus: eraka = metal infusion (Ka.); Vikalpa: Spy = heraka Ko. er uk- (uky-) to play 'peeping tom'. Kui ēra (ēri-) to spy, scout; n. spying, scouting; pl action ērka (ērki-). ? Kuwi (S.) hēnai to scout; hēri kiyali to see; (Su. P.) hēn?- (hē?-) id. Kur. ērnā (īryas) to see, look, look at, look after, look for, wait for, exam- ine, try; ērta'ānā to let see, show; ērānakhrnā to look at one another. Malt. ére to see, behold, observe; érye to peep, spy. Cf. 892 Kur. ēthrnā. / Cf. Skt. h**eraka**- spy, Pkt. her- to look at or for (DEDR 903) *hērati 'looks for or at'. 2. hēraka—, °rika— m. 'spy' lex., hairika— m. 'spy' Hcar., 'thief' lex. [J. Bloch FestschrWackernagel 149 ← Drav., Kui ēra 'to spy', Malt. ére 'to see', DED 765] 1. Pk. hēraï 'looks for or at' (vihīraï 'watches for'); K.?o?. hērūō 'was seen'; WPah.bhad. bhal. h e_ rnū 'to look at' (bhal. hirā?ū 'to show'), pā?. hēra?, pa?. hē?ā, cur. hērnā, Ku. her?o, N. hernu, A. heriba, B. herā, Or. heribā (caus. herāibā), Mth. herab, OAw. heraï, H. hernā; G. hervũ 'to spy', M. her?ẽ. 2. Pk. hēria— m. 'spy'; Kal. (Leitner) "hériu" 'spy'; G. her? m. 'spy', herũ n. 'spying'. (CDIAL 14165).

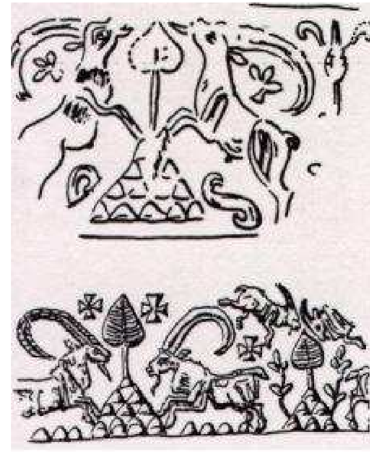


The location of Sembiyan-kandiyur is not far from Swamimalai where the shrine of Subrahmanya (one of the arupat.aiveet.u, that is, one of the six camps of the commander) is called eraka-subrahmanya. Eraka ! Copper, metal infusion. At Swamimalai, the artisans make bronze murti-s in the vis'vakarma tradition – using cire perdue technique (lost wax process) which was used by the artisans of Sarasvati civilization. (See annex on lost-wax method used in southeast asia bronzes).



er-agu ‘a bow, an obeisance’ (Ka.)

Mountain topped by a leaf gets stylized as an important motif. Pro-elamite glyptics. Leaf motif. 1-c, After Legrain,L., 1921, Empreintes de cachets elamites, *Mem. Mission Arch. De Perse* 16, Paris: 62-654; d. After Amiet, P., 1961, *La glyptique mesopotamienne archaique*, Paris: 497; Mundigak IV.3; 3. After Casal, J.M., 1961, Fouilles de Mundigak I-II. *Mem. Delegation Arch. Franaise en Afthanistan* 17, Paris: fig. 102: 485; f. Early Harappan. Kalibangan. After Sankalia, 1974: 346, fig. 88d, A. H-L; cf. Fig. 23.45 Asko Parpola, 1996, fig. 23.45. Two goats eating from a tree on a mountain top in proto-Elamite seals from Susa [After Amiet, P., 1972, Glyptique susienne I-II, *Mem. Delegation Arch. En Iran* 43, Paris: 978 and Legrain, L., 1921, Emprientes de cachets elamites, *Mem. Mission Arch. De Perse* 16, Paris: 316].





Tree and lion on lower register, superimposed by proto-elamite inscription. Tree motifs are repeated in the epigraph. Administrative tablet with seal impression in proto-cuneiform, Mesopotamia, circa 3000–2900 B.C.

Chlorite vessel found at Khafajeh: Ht 11.5 cm. 2,600 BCE, Khafajeh, north-east of Baghdad (Photo from pg. 69 of D. Collon's 1995 *Ancient Near Eastern Art*). The vessel was made somewhere east of Baghdad, possibly in Iran, and transported to Khafajeh where it was found. At the left of the panel, a man wearing a net skirt is kneeling on a pair of Zebus who are standing back to back. He is holding streams of water showering down onto vegetables and a palm tree. The wavy line above his head may be rain clouds, they share the sky with a crescent moon and a rosette sun. The second figure is also depicted with a rosette at his shoulder. He has a snake in each hand and is standing between two felines, both turned in his direction. At the right of the panel, a bull is being attacked by a large bird (eagle) and a lion while another small animal faces the other way. This image was created by rotating the straight sided vessel for the exposure of the photograph.



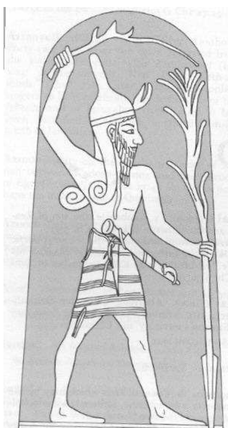
Cylinder seal: Ht. 3.6 cm. 2,220 - 2,159 BCE, Mesopotamia (Photo from pg. 216 of J. Aruz and R. Wallenfels (eds.) 2003 *Art of the First Cities*).

This Akkadian example of a seal impression shows a hero wrestling with a water buffalo (left) and a bull-man struggling with a lion (right). The figures are separated by a tree on a mountain. The hero faces the viewer and dominates the scene. Akkadian seals tend to be arranged into clusters of figures that display physical tension in scenes of active combat.



Detail from "Great Lyre" from Ur: Ht 33 cm. 2550 - 2400 BCE, royal tomb at Ur (Photo from pg. 106 of J. Aruz and R. Wallenfels (eds.) 2003 *Art of the First Cities*).

The front panel of the sound box from the so-called Great Lyre was recovered among grave goods in the royal tomb at Ur. The panel is made of shell and bitumen and is divided into four registers. The top panel is of a male embracing two human headed bulls, the three lower panels show scenes from a funerary banquet in which animals play the roles normally assumed by humans.



Baal, the storm god, is represented holding a club in his left hand. The lance extends upward in the form of a tree, or stylized lightning. Found at Ras Shamra in 1932.



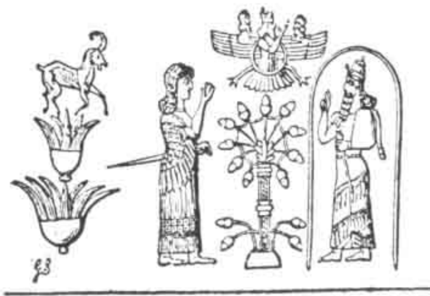
Baal. Name of the most prominent Canaanite deity. As the god of fertility in the Canaanite pantheon (roster of gods), Baal's sphere of influence included agriculture, animal husbandry, and human sexuality... Baal worship became prominent in the northern kingdom of Israel during the days of King Ahab when he married Jezebel of Tyre. It later *infiltrated the Kingdom of Judah. See also: http://phoenicia.org/pagan.html

http://www.edwardtbabinski.us/history/tree_of_life.html

Mesopotamian limestone cylinder seal and impression—worship of Shamash, (Louvre). Cult scene: the worship of the sun-god, Shamash. Limestone cylinder-seal, Mesopotamia. AO 9132 Department of Oriental Antiquities, Richelieu, ground floor, room 6, case 4 The owner of this seal can be identified from the cuneiform inscription which translates: 'Seal of Mushezib-Ninurta, governor, son of Ninurta-eresh, ditto, son of Samanuha-shar-ilani, ditto.' Samanuha-shar-ilani was ruler of Shadikanni (Arban in eastern Syria), in 883 BC, and an Assyrian vassal - subject to the firm control of Assyria, and enjoying the wealth and security that such political domination provided.



During this period, seal designs were often cut on hard stones using cutting-wheels and drills. The image is similar to two wall reliefs from the throne room of King Ashurnasirpal II (reigned 883-859 BC) at Nimrud. The king, shown in mirror image, is protected by guardian genii sprinkling holy water from a bucket using what may be a fir cone or sponge. A stylized tree stands in the centre, symbolizing nature and the land of Assyria. Above is a god in the winged disc. Length: 4.9 cm Diameter: 1.7 cm Found by H.C. Rawlinson and acquired by The British Museum around 1852 D. Collon, First impressions: cylinder seals in the Ancient Near East (London, The British Museum Press, 1987), pp. 76-7, fig. 341 A.H. Layard, Discoveries in the ruins of Nineveh and Babylon (London, J. Murray, 1853), p. 603



http://www.greatdreams.com/reptlan/pindar.htm

http://www.sacred-texts.com/evil/hod/img/04000.jpg

Amots Dafni **(**Institute of Evolution, Haifa University, Haifa 31905, Israel), 2006, On the typology and the worship status of sacred trees with a special reference to the Middle East, J Ethnobiol Ethnomedicine. 2006; 2: 26. May 15, 2006 This article contains the reasons for the establishment of sacred trees in Israel based on a field study. It includes 97 interviews with Muslim and Druze informants. While Muslims (Arabs and Bedouins) consider sacred trees especially as an abode of righteous figures' (Wellis') souls or as having a connection to their graves, the Druze relate sacred trees especially to the events or deeds in the lives of prophets and religious leaders. A literary review shows the existence of 24 known reasons for the establishment of sacred trees worldwide, 11 of which are known in Israel one of these is reported here for the first



time. We found different trends in monotheistic and polytheistic religions concerning their current worship of sacred trees.
http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=1500805
Plaque from Royal tomb of Ur, ca. 2600 to 2500 BCE. Entwined in the branches of a flowering tree, two goats appear to be nibbling on its leaves. This decorative plaque which was carved from shell and highlighted with bitumen was also excavated from the Royal Tombs.



Impression from a marble cylinder seal from fourth-millenium B.C. Uruk in southern Mesopotamia, showing a ruler feeding two sheep from a sacred tree.



Fragment of a bronze helmet from Argishti I's era. The "tree of life", popular among the ancient societies, is depicted. The helmet was discovered during the excavations of the fortress Of Teyshebaini on Karmir-Blur (Red Hill).
http://en.wikipedia.org/wiki/Urartu See: A. Sayce, The Kingdom of Van (Urartu), Cambridge Ancient History, vol. II, p. 172 See also C. F. Lehman-Haupt, Armenien Einst und Jetzt, Berlin, 1931, vol. II, p. 497

This persistent portrayal of the tree of life with its guarding celestial beings pervaded the Urartian culture. For generations, personal seals imprinted the sacred tree on

correspondence carried throughout the empire (25). Rulers and administrators sipped wine from bronze cups stamped with the emblem of the tree (26). Urartian warriors carried the symbol of the sacred tree to battle on bronze belts (27) and pointed helmets (28). Carved stones displayed the sacred tree throughout the land (29). Colorful wall paintings (30) and carved columns (31) in palaces and other buildings repeated the recurring theme. **25. Piotrovskii, pp 72, 74;** See: Boris B. Piotrovsky, *The Ancient Civilization of Urartu*, Cowles Book Co., Inc., New York, NY, 1969

25. Piotrovsky, pp 127,157
26. Piotrovsky, pp 153
27. Piotrovskii, pp 48, 49, 50; Piotrovsky, pp 177
28. Piotrovskii, pp 46; Piotrovsky, pp 160
29. Piotrovskii, pp 66, 69, 64
30. Piotrovskii, pp 78-79; Piotrovsky, pp 70; Lloyd, pp 120
31. Piotrovsky, pp 132

Ancient kingdom of Urartu (Biblical Mount Ararat) around Lake Van, southwestern Asia. Today the region is divided among Armenia, eastern Turkey, and northwestern Iran. The kingdom flourished *c.* 13th – 7th century BC, enjoying considerable power in the Middle East in the 9th – 8th century. Archaeological finds date from the time of King Shalmaneser I (*c.* 1274 – 45) of Assyria.

The kingdom's native name was *Biainili*. Scholars believe that "Urartu" is an Akkadian variation of **Ararat** of the Old Testament. The variations possibly originate from the Armenian "Ayrarat," which in Armenian means "land of the brave" and "land of Armenians." Armenian Soviet Encyclopedia, v. 12, Yerevan 1987, p. 280



SACRED TREE WITH ATTENDANTS ON LID FROM STEATITE JAR. (Urartian, 8th Century B.C. Armenian Historical Museum, Erevan).



http://www.starspring.com/ascender/urartu/urartu.html

Relief: Sacred Tree Attended by Winged Beings; Neo-Assyrian period, reign of Ashurnasirpal II (r. 883–859 B.C.) Mesopotamia; excavated at Nimrud (ancient Kalhu)

Alabaster (gypsum) The plant represented on both registers of this relief is the so-called sacred tree. Its trunk rests on a flat base and is topped by a palmette, and it is encircled by smaller palmettes connected to the trunk by a network of branches. In the upper register, the sacred tree is attended by human-headed genies. In the lower register, bird-headed genies holding buckets and cones fertilize the tree in a manner similar to the manual fertilization required for date palm trees to bear fruit. The sacred tree was an extremely important symbol in the palace of Ashurnasirpal, appearing on reliefs in virtually every room of the palace. It was also used in textile patterns, on stamp and cylinder seals, and in ivory carvings. It represented both the king and Ashur, the chief god of Assyria, and was also a symbol of the fertility of the land. http://www.metmuseum.org/explore/anesite/html/el_ane_relief4.htm

The Assyrian Tree of Life of Ashur depicts a column with seven branches along each of its sides, crowned with a blossom or flower of spherical shape, from which three light beams emanate.
http://www.meditaid.com/Projects/TheTreeofLife/tabid/56/Default.aspx



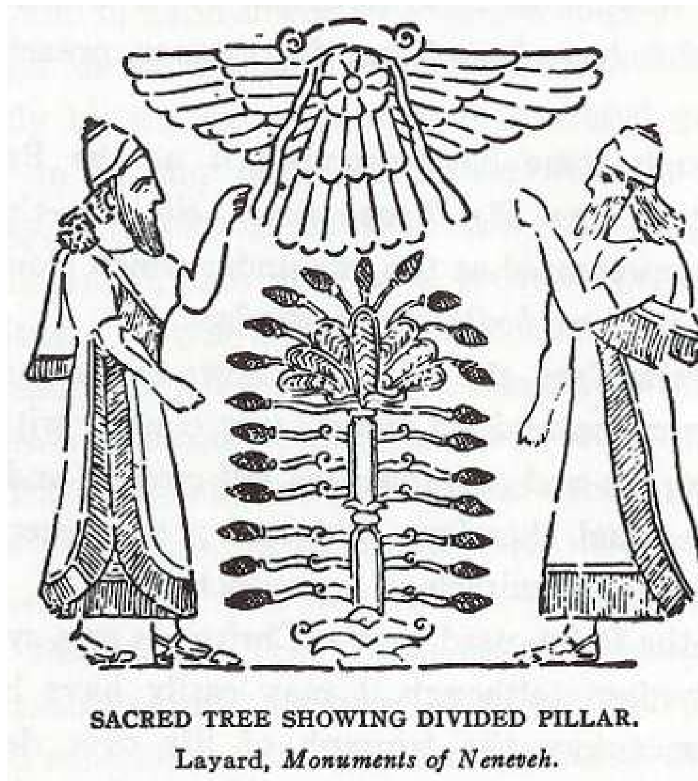
Assyrian Ashurnsirpal Relief Assyrian Ashurnsirpal Relief from Nimrud, 865 B.C., can now be found at the British Museum. This section of wall relief was behind the king's throne and depicts a ritual involving a tree. Another panel with the same scene was opposite the center doorway of the throne room. The king is shown twice, on either side of a symbolic tree. On the left and on the right is an apkallu. This relief is made from compound stone with an antique sandstone finish. It measures 24”W x 13”H. Normally, floating above the Assyrian tree of life was the god Assur—this corresponds to Ein Sof, which is also, via a series of transformations, supposedly derived from the Assyrian word Assur. http://www.answers.com/topic/simo-parpola Simo Parpola, 1993, The Assyrian tree of life, JNES 32 (1993), pp. 161-298l

Giovino, Mariana, 2007, The Assyrian sacred tree, a history of interepretations, Orbis biblicus et orientalis 230, Academic Press, Fribourg, Coedition with Vandenhoeck & Ruprecht, Göttingen

The Assyrian Sacred Tree A History of Interpretations

The so-called Assyrian sacred tree is the most discussed motif in the historiography of Assyrian art. It is familiar from the reliefs in the throneroom of A__urnasirpal II at Nimrud, but it has a family of close relatives that appear in a variety of other media. To date, no contemporary text has been found that mentions this ‘tree,’ and, as a result, scholars have not yet arrived at a consensus on its iconography. Nevertheless great efforts have been made to decipher the symbol, ever since A. H. Layard

recovered the Nimrud reliefs in the mid-nineteenth century. This book traces the intricate history of the iconographic debate, from 1849 to the present. Scholars have tended towards three principal interpretations of the sacred tree: that it represents the 'tree of life' known from Genesis, or a stylized date palm, or a constructed cult object. The 'tree of life' theory has had few takers since the late nineteenth century (although it has recently enjoyed a small revival); the date palm interpretation, on the other hand, has dominated the discussion since 1890, when E. B. Tylor proposed that winged figures standing on either side of the 'tree' were fertilizing it. This analysis has had a number of serious objections levelled against it from the beginning, but it managed to thrive, primarily because it built up a critical scholarly mass early on in the debate. The third of the main interpretations, the cult object theory, also fell victim to the date palm theory in the middle of the last century, and the details of its argument have been largely forgotten by recent contributors to the debate. In the author's view it is the most promising of the three, and she builds upon the arguments of earlier cult object theorists using archaeological and textual material. This book, then, is a critical historiography, which both surveys the vast literature on this topic and intervenes in the debate. It will be found invaluable by anyone who wishes to study this enigmatic motif, and it will also be of interest to historians of Assyrian art and religious cult. And, as an analysis of the ways in which a scholarly debate can fall victim to an implausible consensus, it will provide a useful test case for students in the growing field of historiography.
Mariana Giovino (b. 1964) is an honorary research fellow in the History department at University College London. She completed her Ph.D. in the History of Art department at the University of Michigan, Ann Arbor, and previously completed an M.A. in History of Art and one in Assyriology at the same institution.
B.N. PORTER**,** *Trees, Kings, and Politics*, Fribourg (Academic Press) - Göttingen (Vandenhoeck & Ruprecht) 2003 (= Orbis Biblicus et Orientalis 197),
Compilation of nine essays (two of which previously unpublished) by a leading Assyriologist focusing on the role of visual imagery in Assyrian propaganda and illustrated with 4 line-drawings and 33 plates. The Assyrian sacred tree is the central topic of the first four contributions: "Assyrian Bas-reliefs at Bowdoin College", pp. 1-10; "Sacred Trees and Date Palms", pp. 11-20; "The Meaning of the Assyrian Tree Image", pp. 21-30 and "Seasonal Time and Eternity in Ancient Assyria", pp. 31-38).
http://www.akkadica.org/libro_Trees-Kings.htm
Assyrian "Sacred Tree," a highly stylized Date-Palm (?) with a stylized border of vines (?) about it from the Assyrian palace at Nimroud (ancient Calah of the Bible). Perhaps this is a possible prototype behind Genesis' "Tree of Life" in the Garden of Eden? Palmtrees decorated the Temple of Solomon's walls in association with Cherubim (1 Kings 6:32). Eden's Tree of Life was guarded by Cherubim too. Date-Palms are an important food source in Oasis villages; perhaps this is why it became the "Tree of Life." ? (cf. p.44. Austen Henry Layard. *A Popular Account of the Discoveries at Nineveh.* London. John Murray. 1852)
http://www.bibleorigins.net/Sacredtreeassyrian.html

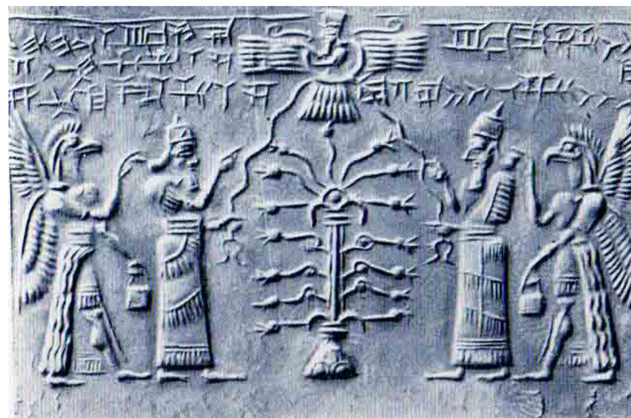

SACRED TREE SHOWING DIVIDED PILLAR.
Layard, *Monuments of Neneveh.*

"It first appears on Chaldean cylinders as a pillar or "World Spine" surmounted by a crescent, frequently the pillar is thrice-crossed by branches which end in circles. About the beginning of the tenth century B.C. the tree becomes more complex. Conventionalised into elaborate and graceful forms, it was one of the most conspicuous objects found on the sculptures and monuments of Khorsabad and Nimroud."

http://altreligion.about.com/library/texts/bl_ancientpagan18.htm

Seal of the 9th century (?) from Shadikanni on the Habur.
http://www.specialtyinterests.net/eop8.html





Stele of Naarm-Sin, an early Semitic King of Agade in Babylonia, who reigned about B. C. 3750. From the photograph by Messrs. Mansell & Co. http://www.gutenberg.org/files/17321/17321-h/v1b.htm



Bas-relief in stone showing Lagash's King Gudea (his face hacked away apparently by a non-admirer) being grasped by the hand by the god Ningishzida and led to a seated god (?) who dispenses life-giving freshwater needed for Lagash's crops.

Ningishzida has serpent-dragon heads erupting from his shoulders. The god standing before Ningishzida is unidentified, but he "might be" Dumuzi, who, with Ningishzida in the *Adapa and the Southwind Myth* brought man (Adapa) before Anu to receive the "water of life" (for the photo cf. figure 189. Anton Moortgat. *Die Kunst des Alten Mesopotamien, Die klassische Kunst Vorderasiens*. Darmstadt. Wissenschaftliche Buchgesellschaft. 1967. Verlag M. DuMont Schauberg. Koln). Gudea holds a palm frond in his hand, perhaps from a date palm? Date palm plantations existed in antiquity in Mesopotamia and were an important food source. The Bible suggests for some scholars the "Tree of Life" planted in the Garden of Eden may have been a Date palm as Solomon's Temple is described as having Cherubim and Palmtrees lining its walls (1 Kings 6:32) and God stations the Cherubim to deny man access to the "Tree of Life" in Eden's Garden (Genesis 3:24).

“Yet another proof that the term "Parsee" was used not only in the ethnic sense but in the religious sense in ancient Iran, i.e. before the Zoroastrians emigrated to India, is to be found in the Pahlavi texts, Karnaamak i Artakshir I Papakan (" A History of Ardeshir Papak", the founder of the Sassanian Empire- -226-242 A.D.) and Drakht-i-Asurik ("The **Assyrian** **Tree**"). In the former text, Artakshir has been categorically referred to as, Khvataye Parsikan = the King of the Parsees".”
http://tenets.zoroastrianism.com/acceptance_never_ever_Final_2006.pdf



Leaping Stag c.1300-1200 B.C. Middle Assyrian period. Milky chalcedony. Cylinder seal.
A stag leaps with upflung leg through a wooded, mountainous region, indicated by the twisted trees and scale pattern representing the mountain from which it grows. A small bird is perched on a thistle-like plant beneath the tree.

From Crete, engraved on a beautiful gold seal ring called the Ring of Nestor, found in a beehive tomb at Pylos on the west coast of the Peloponnese and dated to c. 1500

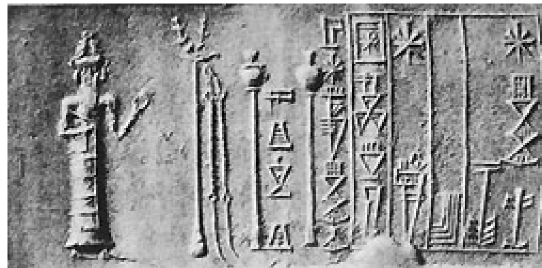
BC. It shows a young deceased couple seated on a branch of a great Tree. Above their heads are two small chrysalises and, hovering near these, two butterflies.



Cretan Seal from Pylos

http://www.annebaring.com/anbar16_reflections.htm

G-Sum 19: Early Dynastic Physician's Cylinder Seal



A most interesting seal of a physician from the Early Dynastic III period. It shows the worshipper, in almost stick figure style, with his arms raised in prayer and a six column inscription. The inscription must be of a standard, formulatic type as it is 90% identical to one on a Old Babylonian physician's seal shown in Chiara's book *They Wrote On Clay* (impression shown below right). Both also show the distinctive "physician's instrument", although Chiara's example also has a sacred tree and two standards with pots, and the god wears a distinctive Babylonian costume. Richly mottled steatite in black, brown and red, 30 x 18 mm, c. 2600-2400 B.C.



G-Sum 22: Akkadian Cylinder Seal with Seated Goddess, Altar and Tree Myth

A short,black steatite seal with a very complex scene. A priest stands before a burning altar in front of a seated goddess with outstretched hands and a star of divinity above her. Behind the goddess a woman sits spinning under a large tree that is being bent or pulled down over her. There is a three character inscription separating the designs, and it is fitted into the design in a crude manner.



King Standing on Sphinxes and Holding a Lion in Each Hand; Palm Tree with Winged Sun-Disk Above Cylinder seal and impression Persia, Achaemenid period (ca. 550–330 B.C.) Agate 32 x 15 mm Seal no. 824

Stone of



Esarhaddon. Memorial relief on black basalt. Ca. 676 B.C. 21.5 cm. British Museum, UK. Inscribed with an account of Esarhaddon's restoration of Babylon. At top, the sacred tree and a horned crown on an altar. Below a Bablylonian plough with seed drill. http://www.hp.uab.edu/image_archive/ue/relief05.jpg



Altar of Tukulti-Ninurta I (1244-1208 B.C.), in Ashur. The god, Nusku, is represented here on the altar as a symbol rather than in anthropomorphic form, which is considered an important feature of emerging Assyrian culture.

http://www.hp.uab.edu/image_archive/ue/relief05.jpg

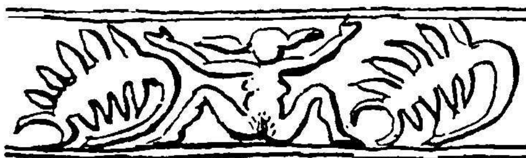
Asherah, the Tree of Life and the Menorah : Continuity of a Goddess symbol in Judaism? *The First Sophia Fellowship Feminist Theology Lecture .The College of St. Mark & St. John. Plymouth. 4th December 1996 by Asphodel P. Long* . Long argues that “there might be a connection, rooted in the Hebrew bible, between the female figure there named Asherah, the Garden of Eden, the Tree of Life and the Menorah (the seven branched candlestick of Jewish life and ritual)…” http://www.asphodel-long.com/html/asherah.html



http://phoenicia.org/pagan.html

“Asherah poles are mentioned in the Hebrew Bible in the books of Exodus, Deuteronomy, Judges, the Books of Kings, the second Book of Chronicles, and the books of Isaiah, Jeremiah, and Micah. The term often appears as merely אשרה, (*Asherah*) translated as "groves" in the King James Version and "poles" in the New Revised Standard Version; no word that may be translated as "poles" in the text. Scholars have indicated, however, that the plural use of the term (*Asherahs*, also *Asherim* or *Asherot*) provides ample evidence that reference is being made to objects of worship rather than a transcendent figure.” van der Toorn, Becking, van der Horst (1999), *Dictionary of Deities and Demons in The Bible*, Second Extensively Revised Edition, pp. 99-105, William B. Eerdmans Publishing Company loc.cit. http://en.wikipedia.org/wiki/Asherah_pole

Vikalpa: kola =**woman** (Nahali) **kola** =tiger (Santali) ***Ta.* kulai (-pp-, -tt-)** to shoot forth in a bunch (as a plantain); ***n.*** cluster, bunch (as of fruits, flowers); ***Ko*. kola- (kolap-, kolat-)** (plant) shoots against (one who planted it; in a proverb); **kole** bunch of plantains. (DEDR 1810) ***Go.*** (Tr.) **kōsānā, kōrsānā** to **sprout**, grow (of trees, plants, etc.) (DEDR 2149). **mukulayati** ‘*blossoms’ (Skt.) (CDIAL 10147)



Rebus: kol =alloy of five metals (Tamil)

A symbolism of a woman spreading her legs apart, which recurs on an SSVC inscribed object. Cylinder-seal impression from Ur showing a squatting female. L. Legrain, 1936, Ur excavations, Vol. 3, Archaic Seal Impressions.

Rebus: kut.hi, kut.i (Or.; Sad. **kot.hi**) (1) the smelting furnace of the blacksmith; **kut.ire bica duljad.ko talkena**, they were feeding the furnace with ore; (2) the name of e_kut.i has been given to the fire which, in shellac factories, warms the water bath for softening the lac so that it can be spread into sheets; to make a smelting furnace; kut.hi-o of a smelting furnace, to be made; the smelting furnace of the blacksmith is made of mud, cone-shaped, 2' 6" dia. At the base and 1' 6" at the top. The hole in the centre, into which the mixture of charcoal and iron ore is poured, is about 6" to 7" in dia. At the base it has two holes, a smaller one into which the nozzle of the bellow is inserted, as seen in fig. 1, and a larger one on the opposite side through which the molten iron flows out into a cavity (Mundari.lex.)





Vikalpa: kut.hi = pubes. kola 'foetus' [Glyph of a foetus emerging from pudendum muliebre on a Harappa tablet.] kut.hi = the pubes (lower down than pan.d.e) (Santali.lex.) kut.hi = the womb, the female sexual organ; sorrege kut.hi menaktaea, tale tale gidrakoa lit. her womb is near, she gets children continually (H. kot.hi_, the womb) (Santali.lex.Bodding) ko_s.t.ha = anyone of the large viscera (MBh.); kot.t.ha = stomach (Pali.Pkt.); kut.t.ha (Pkt.); kot.hi_ heart, breast (L.); kot.t.ha_, kot.ha_ belly (P.); kot.ho (G.); kot.ha_ (M.)(CDIAL 3545). kottha pertaining to the belly (Pkt.); kotha_ corpulent (Or.)(CDIAL 3510). Kot.ho [Skt. kos.t.ha inner part] the stomach, the belly (G.lex.) ku_ti = pudendum muliebre (Ta.); posteriors, membrum muliebre (Ma.); ku.0y anus, region of buttocks in general (To.); ku_di = anus, posteriors, membrum muliebre (Tu.)(DEDR 188). ku_t.u = hip (Tu.); kut.a = thigh (Pe.); kut.e id. (Mand.); ku_t.i hip (Kui)(DEDR 1885). gu_de prolapsus of the anus (Ka.Tu.); gu_da, gudda id. (Te.)(DEDR 1891).

This sculpture showing a scorpion on the hip of a woman sculpted on Khajuraho temple friezes is explained as a pun on the word kharjura 'scorpion'. Another explanation could be the lexeme, kut.a 'thigh' could be linked to kut.i 'smelting furnace for bica 'stone ore'); rebus: bica 'scorpion'.
On the lid of an ivory pixus from Minet el-Beida , Ugarit sea-port. She holds a bunch of plants on each hand. Carved in ivory. Cretan style skirt. Jackals (?) on either side. Asherah. In the Old Testament she is identified with her sacred groves. See also: http://www.amazon.com/Religions-Ancient-World-University-Reference/dp/0674015177 Sarah Iles Johnston **Religions of the Ancient World: A Guide (Harvard University Press Reference Library)**
baria~u, bhal, bhale great (Santali.lex.) See abaru = be strong, powerful (Akkadian/Assyrian).
Some of the glyphs on tannach cult stand have parallels in Indus script -- Sarasvati glyphs. For example, the two goats standing up and

flanking a tree, see epigrpah on tablet, m1393, m1430C Parpola (tree becomes sacred in ancient Assyrian tradition and also in the Indic tradition). Lion is a recurrent motif on Assyrian glyphs, tiger is a recurrent motif on Sarasvati glyphs.

Since Sarasvati glyphs are hieroglyphs, there is a possibility that the Assyrian glyphs are also hieroglyphs, read rebus.

eru_, aru = eagle (Akkadian/Assyrian)

aru_ = lion (Mergal as divinity of devastation is called A-ri-a)(Akkadian)

abru = wing (Akkadian/Assyrian)

What could the rebus homonys be?

aba_ru = lead, antimony (cf. CAD A (II): 126; AHw 49)

abaru = be strong, powerful; strength, power (Akkadian/Assyrian)

[Thus, when wings are ligatured to royalty, it may be rebus abaru, 'powerful, strong'.]

aru = copper; eru_ = copper?, bronze (eru_, 'engrave, carve'); urudu = bronze (Akkadian); hurru (CAD) = mined copper (Akkadian)

urru, u_ru = heap, mountain (Akkadian/Assyrian) [Some glyphs show goats flanking a mountain with a leaf on the summit.]

In one of the pictures, a plough or seeding drill is also shown, together with a mountain (BM91027 "Pictographs" on Esarhaddon foundation stone ("Black Stone")):

There are some homonymous parallels (perhaps, cognates) in Indic languages.

he_rka pl. plough (Kuwi)(DEDR 2816). si(h)a_ra_ drill for sowing seed (L); sia_ra = furrow (Or.)(CDIAL 13429)

eraka, era = syn. erka, 'copper, weapons' (Ka.); erako_lu = iron axle of a carriage (Ka.M.)

erako = molten cast (Tu.); eh-ku =steel (Ta.)
eruvai = a kind of kite whose head is white and whosse body is brown; eagle (Ta.); eruva = eagle, kite (Ma.)(DEDR 819)

er-aka = upper arm, wing (Te.)

It appears that many of the Akkadian glyphs are also hieroglyphs. At the following URL, a picture is included shwoing a winged-tiger ligatured to the head of an eagle/kite on a Nal pot.
http://pages.google.com/edit/kalyan97/bronzeagetradeandmlecchawriting

In this instance, the wing becomes a phonetic determinant for the 'eagle': eruva.

Vikalpa: kut.i = tree; rebus: kut.hi 'furnace, smelter' (Santali)

loa = a species of fig tree, ficus glomerata (Santali) [Hence, the depiction of a fig-leaf (pipal) on the summit on some glyphs.] Rebus: lo(h) = metal (H. and many languages of Indic language family)A phonetic determinant is lo = nine (Santali); and hence, nine leaves are shown on some epigraphs (m296 Parpola).

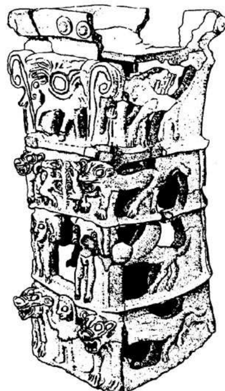
Tiger is a hieroglyph. kola 'tiger' (Munda); rebus: kol 'pancaloha, alloy of five metals' (used normally for making bronze statues)(Ta.). Koles are smelters. kollan 'smith' (Ta.) Thus, ligatured to an egle, the hieroglyph connotes: 'molten cast metals (alloys)' -- kol erako. An epigraph connoting the product of a smithy/mint.

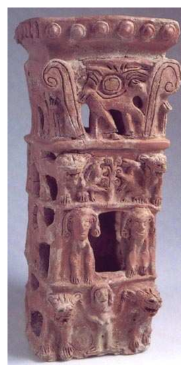
PS:Mountain topped by a leaf gets stylized as an important motif. Proto-elamite glyptics. Leaf motif. 1-c,After cachets elamites, Mem.

Legrain,L., 1921, Empreintes de Mission Arch. De Perse 16, Paris: 62-654; d. After Amiet, P., 1961, La glyptique mesopotamienne archaique, Paris: 497; Mundigak IV.3; 3. After Casal, J.M., 1961,

Fouilles de Mundigak I-II. Mem. Delegation Arch. Franaise en Afthanistan 17, Paris:fig. 102: 485; f. Early Harappan. Kalibangan. After Sankalia, 1974: 346, fig. 88d, A. Leaf on a mountain motif becomes a seal from Kalibangan. k53 (Parpola)
http://www.hindunet.org/saraswati/munda/furnace1.pdf



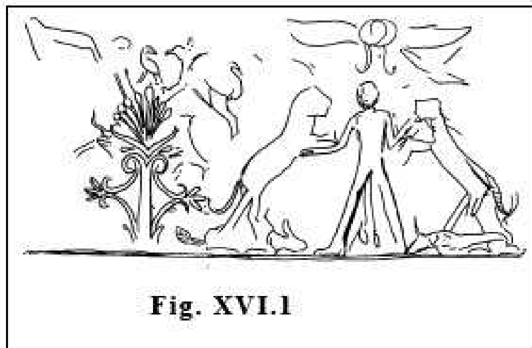




H-L; cf. Fig. 23.45 Asko Parpola, 1996, fig. 23.45. **Taanach** , in the Bible, royal city of Canaan, central ancient Palestine, the modern Tell Ti'innik, West Bank, SE of Megiddo. Sisera was defeated here by Deborah and Barak.

http://www.highbeam.com/doc/1E1-Taanach.html Canaanites are now known as Phoenicians (Vedic pan.i?).
See: Taanach stand
http://www.transoxiana.org/11/roberts-near_east_trees.html *Trees as tributes in the Ancient Near* East by Janet Roberts (2006).
Helene Kantor,1945, "Plant Ornament: Its Origin and Development in the Ancient Near ast", http://oi.uchicago.edu/OI/DEPT/RA/HJK/HJKIntro.html
Erika Bleibtreu, *Die Flora der neuassyrischen Reliefs*. (Wien, 1980).
The most remarkable part of the following analysis by Kantor relates to the design of the 'Assyrian tree' as a hybrid design of a pole ornamented with copper bands.

This use of copper bands as decorative elements, provides the link to smithy and helps identity the 'hieroglyphic' sea peoples, the assur who are now found in the Ganga river valley. Is the name 'assur' of these people and the 'assur' of Assyria, a mere coincidence?


Fig. XVI.1

Helene J. Kantor explains the figure which contains the contest motif of Sarasvati hieroglyphs: a person holding back two rearing tigers.

[quote] As Riegl and others have pointed out, the creations of the ancient Orient provided the sources from which the plant ornaments of Greece developed. These, in turn, supplied the basis for the later development of vegetal decoration, in the East as well as in the West…Figure XVI.1 is composed in the same free field manner characteristic for the higher products of the Mitannian seal cutters, but no longer used in the developed Assyrian style of 13th century Mitanni seals. The composition consists of two main groups, one being a hero quelling two raging lions mounted on couchant bulls. We have not found detailed parallels for this group on Mitannian seals, but its core, the axial human figure between two diagonal beasts of prey, can be matched by groups on Mitannian and Second Syrian seals in which the hero is kneeling. Above the man of Fig. XVI.1 is suspended the winged sun disc so common in Mitannian and Syrian glyptic hooks. Herzfeld has pointed out that these fine parallels in the cartouches of the Hittite kings. [unquote]
http://oi.uchicago.edu/OI/DEPT/RA/HJK/HJKI.pdf
http://oi.uchicago.edu/OI/DEPT/RA/HJK/HJKXVI.pdf

[quote] Between the Asia of the Second Millennium B.C. and that of the First, there intervened an epochal upheaval – the migrations during the Twelfth and Eleventh Centuries B.C. The Sea Peoples, rushing across Anatolia, swept away the powerful Hittite kingdom like a 'house of cards'…Chaldean and Aramaean tribes infiltrating into both southern Mesopotamia and Syria had already done much to change the situation in those areas, and a group of people who had not hitherto played a distinct separate role in history, the 'Hieoglyphic' Hittites, now emerged as heirs of

Hittite power in north Syrian states… It seems evident as Sidney Smith and Frankfurt have pointed out, that in Late Assyrian times hybrid plants of these types were really 'sacred trees' and closely associated with the god Assur, even perhaps being a symbol of him. Morover they equate the 'sacred tree' of the seal designs with a cult object described by Sidney Smith as follows: '…at the New Year Festival in Assyria use was made of a bare tree-trunk, around which metal bands, called 'yokes' were fastend and fillets were attached.'Frankfort refers to the evidence that tall cedar poles ornamented with copper bands were set up at the portals of Assyrian temples and goes on to say that certain of our Late Assyrian hybrid designs '…are unintelligible as the rendering of natural trees, but not so if they represent the ritual object consisting of a pole ornamented with coper bands, cloth and ribbon…

'The story has been carried down to the point where the Greeks appear and take into their hands the end results of an evolution, the roots of which extend back into the Third Millennium B.C. In the later Eighth and in the Seventh Century B.C., when Greek rt was transformed under the potential influence of the Orient, vegetal motives became prominent elements in the Hellenic repertory. The work of Poulsen reaffirmed the tremendously important role played the Phoenicians in the transmission of oriental traditions to Greece. (Frederick Poulsen, *Der Orient und die Fruhgriechische Kunst*, Berlin, 1912). There has been much discussion as to the routes by which oriental influence reached the Greek mainland. Humfry Payne, for example, has emphasized the importance of Crete as an intermediary (Humfry Payne, *Necrocorinthia*, Oxford, 1931, pp. 4f.), whereas Wace and Blegen still consider that the main route went via Cyprus, Rhodes and Cyclades. (*Klio*, XXXII, 1929, 141f.) In any case, there can be no denying that oriental influences were carried by objects, such as small carvings of ivory or other materials and metal work, made for the most part in Phoenician workshops.' [unquote] Source: HJ Kantor, Plant ornament in the Ancient Near East, Chapter XVIII: Late Assyrian Plant Ornament, H. Frankfort, 1939, *Cylinder Seals*, London, p. 205. Sidney Smith, Early History of Assyria, p. 123. Revised: August 11, 1999.
http://oi.uchicago.edu/OI/DEPT/RA/HJK/HJKXVIII.pdf
http://oi.uchicago.edu/OI/DEPT/RA/HJK/HJKXX.pdf

See the Greek continuum of hieroglyptic art forms using Greek gems and Phoenician scarabs. http://tinyurl.com/2psl4a Hieroglyphs of lion or panther attacking bull or boar or antelope (Starting with a review of Sibri cylinder seals showing lion hieroglyphs the hieroglyphs are traced into Greek gems of Phoenician scarabs).





Comparable motifs of the flower-bud, volute and double-volute also occur on srivatsa ayagapatta. Scan 0053011 Huntington archive. http://huntington.wmc.ohio-state.edu/

Makara Bharhut, c. 100 BC Indian Museum, Calcutta
Something of the origin of the makara, or at least its early

composition in India, can be seen here. The water beast, confined beneath a ledge with kneeling rams that represent the realm of land, is pictured here with the snout of a crocodile, the head and forequarters of an elephant, the body of a snake, and the fins and tail of a fish. http://www.art-and-archaeology.com/india/calcutta/cm13.html



haangi 'mollusc, shell'; rebus: sangha, guild of smiths, e.g. lohar sangha attested in some inscriptions.

rotate left to see portable furnace comparable to the standard device on many Indus script seals.



a variant of s'rivatsa glyph; two fish-tails tied together; two jointed fishes; sangad.a 'furnace' (jointed animals); rebus: sangha; kolimi 'smithy, forge'; rebus: kolli 'fish'; go_nt 'to tie'; gud.i 'shrine'.
http://docs.google.com/View?id=ajhwbkz2nkfv_36gqrd6m
The hypothesis of the set of monographs related to mlecchita vikalpa at http://tinyurl.com/2sh5pd (Writing system) is that Phoenician workshops were mleccha workshops, where mlecchita vikalpa hieroglyphs evolved in the third millennium and second millennium BCE and related to the mleccha (meluhha) travels around the contact areas in search of mineral sources, tin, in particular. The underlying mleccha lingua franca of the civilization and contact area unravels, with particular reference to the repertoire of vis'vakarma karma_ra, kamar, smiths. Testing of this hypothesis will take us into the art world of Begram ivories.

Winged Disk and the Tree of Life

Wednesday, November 19, 2003 -



The owner of this seal can be identified from the cuneiform inscription which translates: 'Seal of Mushezib-Ninurta, governor, son of Ninurta-eresh, ditto, son of Samanuha-shar-ilani, ditto.' Samanuha-shar-ilani was ruler of Shadikanni (Arban in eastern Syria), in 883 BC, and an Assyrian vassal - subject to the firm control of Assyria, and enjoying the wealth and security that such political domination provided.

During this period, seal designs were often cut on hard stones using cutting-wheels and drills. The image is similar to two wall reliefs from the throne room of King Ashurnasirpal II (reigned 883-859 BC) at Nimrud. The king, shown in mirror image, is protected by guardian genii sprinkling holy water from a bucket using what may be a fir cone or sponge. A stylized tree stands in the centre, symbolizing nature and the land of Assyria. Above is a god in the winged disc.
Length: 4.9 cm
Diameter: 1.7 cm
Found by H.C. Rawlinson and acquired by The British Museum around 1852

D. Collon, *First impressions: cylinder seals in the Ancient Near East* (London, The British Museum Press, 1987), pp. 76-7, fig. 341
A.H. Layard, *Discoveries in the ruins of Nineveh and Babylon* (London, J. Murray, 1853), p. 603
http://ancientx.com/nm/anmviewer.asp?a=20&z=1









"…two fully preserved reliefs from the Northwest Palace at Nimrud (Kalhi) display figures arranged in two superimposed registers. The upper one has representations of small, kneeling figures. The winged deities are wearing horned head gear and are touching the palmettes of the sacred tree with their hands. In the lower register, two winged, eagle-headed figures are facing each other while holding small buckets (situlae) and cones in their hands for the anointment of the sacred tree located in the middle of the scene. The relief figures are separated by a broad central band with a cuneiform text 21 or 22 lines long. This so-called standard inscription of Ashurnasirpal II describes his greatness as a ruler, his military success, his invincibility, his building projects, but also his piety and adoration of the gods. "
http://www.econ.iastate.edu/classes/econ355/choi/bab.htm



An eagle-headed, winged divinity stands facing a tree of life (the ends of the branches are just visible at the right edge). The figure was a small section of the wall decoration in the state apartments of the royal palace at Nimrud in northern Iraq, built by Assurnasirpal II, King of Assyria. The deity holds a bucket in one hand and in the other a spathe (leaflike sheath for the flowers) of the date palm.

http://www.dia.org/collections/ancient/mesopotamia/47.181.html



Anunnaki devas on outer portions of the mural, Sumerian humans on inner portion surrounding a depiction; "Tree of Life" with Anunnaki placed on Winged-Disc above.
http://en.wikipedia.org/wiki/Mesopotamian_mythology

See also: Parpola, S. (1993). *The Assyrian Tree of Life: Tracing the Origins of Jewish Monotheism and Greek Philosophy*. Journal of Near Eastern Studies, Vol. 52 No. 3, pp. 161-208

"In this article, Parpola identifies and analyzes a recurrent symbolic Tree in 4th millenium Mesopotamian iconography and then goes on to argue very persuasively that this image/idea is the origin for the Tree of LIfe popularized in Jewish Kabbalah." http://www.tarotforum.net/showthread.php?t=59229

"The Mesopotamian Tree

A stylised tree appears for the first time as an art motif with clearly religious significance in ancient Mesopotamia. It already occurs in prehistoric graffiti and on pottery, and later becomes a favoured motif on seals, particularly in imperial glyptics. Under the Neo-Assyrian Empire (930-607 BC) it is found virtually everywhere: on cylinder and stamp seals, jewellery, glazed tile panels, sculptures, wall paintings and columns of royal palaces, royal garments, furniture, implements, helmets, weapons, and so on.
Art-historically, the Mesopotamian tree (in its many variant forms) without any question belongs to the same tradition as the later Jewish, Christian, Islamic, and Indian Tree of Life. The available, very abundant evidence leaves no doubt that as an art motif, the Tree spread from Mesopotamia to other parts of the ancient Near East, and that e.g. the typical first-millennium Israelite tree (two caprids climbing up an almond tree) and its later variant, the seven-branched lampstand (menorah), are both derived from earlier Mesopotamian models. Accordingly, art historians long used to refer to the Mesopotamian tree as the "Tree of Life," taking its affinity with the later Tree of Life as granted. However, there is a complication here. While Mesopotamian texts do contain incidental references to all kinds of mythical trees, the term "Tree of Life" is not unequivocally attested in Mesopotamia…I consulted some literature but could not find any satisfactory explanation of its meaning, much less a coherent theory of what it stood for. Some experts plainly stated they did not know; others speculated that it probably symbolised "fertility." (For this view see most recently B. N. Porter, "Sacred Trees, Date Palms, and the Royal Persona of Ashurnasirpal II," Journal of Near Eastern Studies 52 (1993), 129-139.)"
[Understanding the Tree of Life by
Simo Parpola (2004)] http://insideassyria.com/rkvsf/wwwboard/msgs/Article_2-2DUX.html

ad.aru 'twigs or branches of tree'. Rebus: aduru 'native metal'.

Tree glyph on punch-marked coins of India:



Site	Coins
PATRAHA MAYURBHANJ PESHAWAR NAGPUR, RAWALPINDI	PUNCH-MARKED COINS
BHAGALPUR AHRAURA BAHAL MIRZAPUR VEMBAVUR	"
THATHARI UJJAIN BHILSA-FIND PATRAHA RAIRH	"
KAUŚĀMBĪ	UNINSCRIBED-INSCRIBED COINS
ERAN	LOCAL COINS
KANAUJ (1) TAXILA (2-3) UJJAYINI (4-5)	"
AYODHYA (1-3) ALMORA (4) UDDEHIKA (5)	"
KUNINDA YAUDHEYA	TRIBAL COINS
SĀTAVĀHANA	COINS

http://sarasvati97.spaces.live.com/photos/cns!A74A2ADBFA0A3358!529/

Site	Coins
KOSALA, BHIR-MOUND PATRAHA, GOLAKPUR	PUNCH-MARKED COINS
SWAT, BHIR-MOUND PATRAHA, AURIHAR	"
MAMDAR, MAGADHA BHIR-MOUND, AURIHAR PATRAHA	"
BHIR-MOUND, RAIRH, PATNA	"
AURIHAR, RAJGHAT JAUNPUR, AHRAURA	"
BHIMLI PATAN, NAMBALAM UJJAIN, BAHAL, KOSAM PATRAHA, TAXILA, BHIR-MOUND, THATHARI	"
BHIMALIPATAN, PATRAHA, MAGADHA, BHIR-MOUND, LALGANJ, GOLAKPUR, VEMBAVUR, SINGAVARAN	"
BHIR-MOUND, DHARWAR, PATRAHA, BAHAL, KARIMNAGAR, GULBARGA MAGADHA, SINGAVARANA	"
GULBARGA, PATRAHA, RAIRH, NAGARI FINDS	"

[Pl. 39, Tree symbol (often on a platform) on punch-marked coins; a symbol recurring on many tablets of SSVC].

Tree on platform/railing on Sohgaura copper plate:

The Sohgaura copper plate refers to a pair of kos.t.ha_ga_ra (dva_ra kot.t.haka); the two storehouses described as tri-garbha (i.e. having three rooms) are illustrated on line 1. (Fleet, JRAS, 1907). The illustrations indicate that the three rooms are in three storeys, with supporting pillars clearly seen. The inscription refers to the junction of three highways named Manavati, in two villages called Dasilimita and Usagama. The storehouses were made at this junction for the goods of people using the highways, which are indicated in line 3 by mentioning the three places to and from which they led. One of the names give is reognized by Fleet as Chanchu. (Fleet, JRAS, 63, 1894 proceedings, 86, plate, IA 25. 262; cf. Sohgaura

copper plate/B.M. Barua. *The Indian Historical Quarterly*, ed. Narendra Nath Law. Reprint. 41)

Uninscribed coins of Eran-Vidisha :



1) Ruler : Uninscribed coins of Eran-Vidisha
2) Year : 2nd- 1st Century B.C.
3) Unit : Unknown , Copper
4) Obverse : Tree in railing , Nadipada, Taurine in semicircle , Swastika , Triangular headed
standard River with fishes and tortoises below .
5) Reverse : Blank
6) Reference : Nil





1) Ruler : Uninscribed coins of Eran-Vidisha
2) Year : 2nd- 1st Century B.C.
3) Unit : Unknown , Copper
4) Obverse : Tree in railing , Nadipada, Taurine in semicircle , Swastika , Triangular headed
standard River with fishes and tortoises below .
5) Reverse : Blank



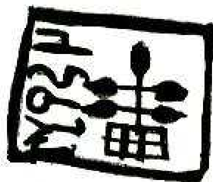


Illustration of Coin (Reverse)
1) Ruler : City state of Bhadravati , Vidarbha region
2) Year : Unknown (200 BC ?)
3) Unit : Unknown ? , Copper
4) Obverse : Elephant standing to right , Standard above Elephant
5) Reverse : Tree in railing; Inscription: Bhadavati
6) Reference : Similar Coin was Published by Mr Prashant P Kulkarni in ICS Newsletter No 1
(April 1990) as ' New Coins of Chhimuka Satavahana '
http://www.geocities.com/ancientcoinsofindia/ujain.htm

m0482At m0482Bt 1620

Pict-65: Gharial (or lizard), sometimes with a fish held in its jaw and/or surrounded by a school of fish.

On tablet m0482, the svastika (satthiya) follows the glyph of a tree branch '*aduru*'; hence the two signs may be read rebus as: *aduru* 'metal' + *sattva 'zinc'.* [Zinc was fundamental in creating the brass alloy used for vessels.] Vikalpa: Pa. *satthika—* 'belonging to a caravan'; *sa_rthika* Skt. 'companion on a journey'; **sārthavāha—** m. 'caravan leader' (Skt. Pa.Pkt.); *satthāha* id. (Pkt.)

Rim of jar 'kan.d. kan-ka'; rebus: kand. 'fire altar, furnace'; khanaka 'miner'. kolmo 'rice plant';rebus: kolami 'furnace'. Circumgraph glyph of oval: kut.ila 'bent'; rebus: kut.ila 'bronze'. The "E" glyph: Comb: **kangha** (IL 1333) *ka~ghera_* comb-maker (H.) Rebus: **kan:g** = brazier, fireplace (K.)(IL 1332) kan:kata = comb (Te.) Rebus: kan:gar = portable furnace (K.) Vikalpa: kut.i 'tree'; rebus: kut.hi 'smelter furnace for iron ore'. Vikalpa: **bar.ae**-bur.ui = to oil and comb someone's hair (Mundari.lex.) Rebus: bar.ea 'merchant' **bakhor.** = teeth of a comb (Santali.lex.) Rebus: **ban:gala** = kumpat.i = an:ga_ra s'akat.i_ = a chafing dish, a portable stove, a goldsmith's portable furnace (Te.lex.)

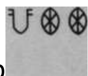
mangar 'crocodile'; kolli 'fish'; rebus: kaula mengro 'smith' (Gypsy).

Some glyphs on line 1: kut.hi = tree; rebus: kut.hi = smelting furnace; kos.t.ha_ga_ra = storehouse; s'u_la = spear; cu_l.a = kiln; kan.d.kanka = rim of jar; rebus: copper furnace; bat.a = quail; rebus: kiln.
Bunch of twigs = ku_di_, ku_t.i_ (Skt.lex.) ku_di_ (also written as ku_t.i_ in manuscripts) occurs in the Atharvaveda (AV 5.19.12) and Kaus'ika Su_tra (Bloomsfield's ed.n, xliv. cf. Bloomsfield, American Journal of Philology, 11, 355; 12,416; Roth, Festgruss an Bohtlingk, 98) denotes it as a twig. This is identified as that of Badari_, the jujube tied to the body of the dead to efface their traces. (See *Vedic Index*, I, p. 177).
ad.aru twig; ad.iri small and thin branch of a tree*; ad.ari* small branches (Ka.); *ad.aru* twig (Tu.)(DEDR 67). Cf. at.artti = thickly grown as with bushes and branches (Ta.) *d.ar a* branch; *dare* a tree; a plant; to grow well; ban: *darelena* it did not grow well; *toa dare* mother, the support of life (Santali) Rebus: aduru 'native metal'.
kut.hi kut.a, kut.i, kut.ha a tree (Kaus'.); kud.a tree (Pkt.); kur.a_ tree; kar.ek tree, oak (Pas;.)(CDIAL 3228). kut.ha, kut.a (Ka.), kudal (Go.) kudar. (Go.) kut.ha_ra, kut.ha, kut.aka = a tree (Skt.lex.) kut., kurun: = stump of a tree (Bond.a); khut. = id. (Or.) kut.a, kut.ha = a tree (Ka.lex.) gun.d.ra = a stump; khun.t.ut = a stump of a tree left in the ground (Santali.lex.) kut.amu = a tree (Te.lex.)
kut.i, 'smelting furnace' (Mundari.lex.).kut.hi, kut.i (Or.; Sad. kot.hi) (1) the smelting furnace of the blacksmith; kut.ire bica duljad.ko talkena, they were feeding the furnace with ore; (2) the name of e_kut.i has been given to the fire which, in lac factories, warms the water bath for softening the lac so that it can be spread into sheets; to make a smelting furnace; kut.hi-o of a smelting furnace, to be made; the

smelting furnace of the blacksmith is made of mud, cone-shaped, 2’ 6” dia. At the base and 1’ 6” at the top. The hole in the centre, into which the mixture of charcoal and iron ore is poured, is about 6” to 7” in dia. At the base it has two holes, a smaller one into which the nozzle of the bellow is inserted, and a larger one on the opposite side through which the molten iron flows out into a cavity (Mundari.lex.) cf. kan.d.a = furnace, altar (Santali.lex.)
Rebus readings of hieroglyphs: body, endless-knot

Glyphs: Headless body, horned kneeling/standing person (Rebus: alloy of copper and bell metal)
Glyph: endless-knot (**mer.hao** = v.a.m. entwine itself; wind round, wrap round roll up; mar.hna_ cover, encase (H) (Santali.lex.Bodding) Rebus: **me~e.he~t** = iron (Santali)

On h176A tablet, a body is ligatured with a wide-mouthed-rimless pot. Bat.a ‘pot’; bat.hi ‘smelter furnace’. t.hat.t.ha ‘body’; rebus: t.hat.t.har ‘copper-bell-metal alloy’) [Phonetic determinant: t.hat.o ‘projecting part of a verandah (WPah.); rebus: t.hat.t.ar ‘an alloy of copper and bell metal’(N.)] The bull is: bali_varda, ba-il; rebus: bali ‘iron sand ore’. The post near the bull may be a variant of the standard device normally shown in front of a one-horned heifer: sangad.a; rebus: jangha_d.iyo ‘military guard carrying treasure’. Perhaps, into the warehouse: mand.a_ (Kon.)

 h176A  h176B
 h176bb  4303 Tablet in bas-relief h176a



Person standing at the centre between a two-tiered structure at R., and a short-*horned bull (bison) standing near a trident-headed post at L. h176b
From R.—a tiger (?); a seated, pig-tailed person on a platform; flanked on either side by a person seated on a tree with a tiger, below, looking back. A hare (or goat?) is seen near the platform.

The two-tiered structure is a frame-work, part of a house which is explained by many lexemes, such as WPah.kc. *tha�o* m. ‘projecting part of a verandah’. Rebus: ***�ha��ar*** ‘an alloy of copper and bell metal’ (N.)

There are sets of lexemes with homonyms for these glyphs: med. ‘body’; man.d.i ‘kneeling’; rebus: med. ‘iron’; man.d.a_ ‘workshop’ (Kon.) Vikalpa: **t.ha_t.hum** = a frame-work, the body (G.) Rebus: **t.hat.era** = a brazier, a caste who manufacture and sell brass ware; t.hat.ori = a worker in brass, a goldsmith (Santali) Thus, the glyph is a homograph for the buffalo horns ‘ta_tta_ra’.

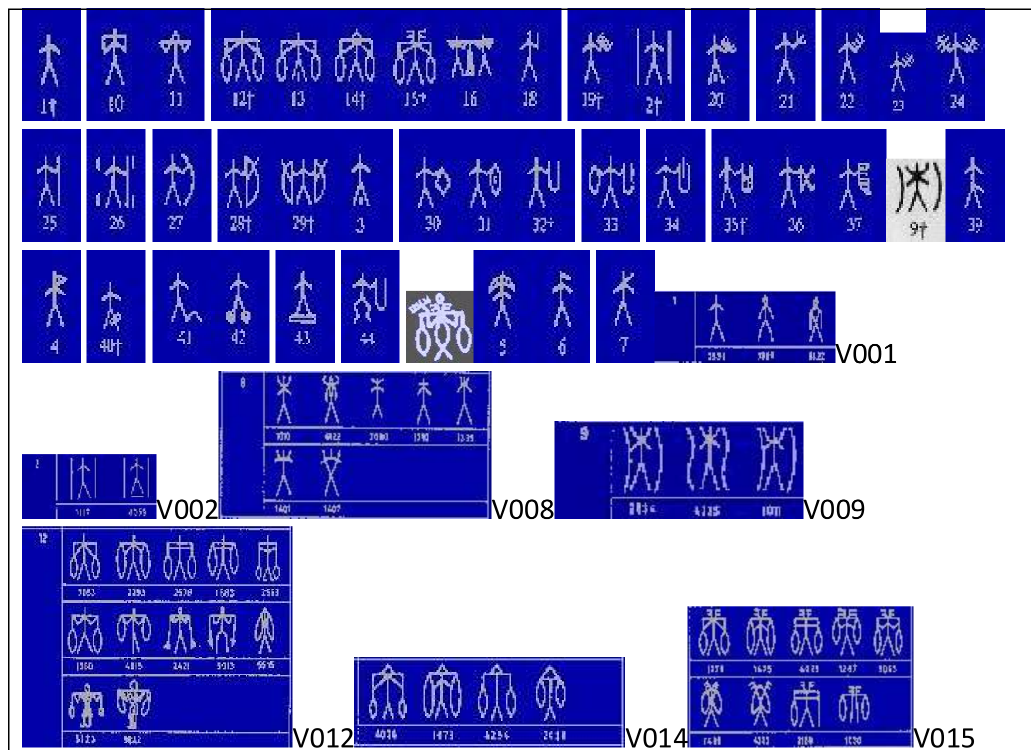
***tha��ha—** 1 ‘**framework**’. [Poss. < ta��á—, but cf. *tra��a—] K. *�ho�hu* m. ‘bridge—pier of logs piled horizontally’, *�ha�hur* m. ‘part of a house—wall made of logs laid horizontally’; P. *�ha�h* f. ‘bridge—pier’; N. *�hā�i* ‘inn (lit. shed made of or covered with bamboo matting?)’; B. *�hā�* ‘**framework**’; Or. *thā�a* ‘**framework**,

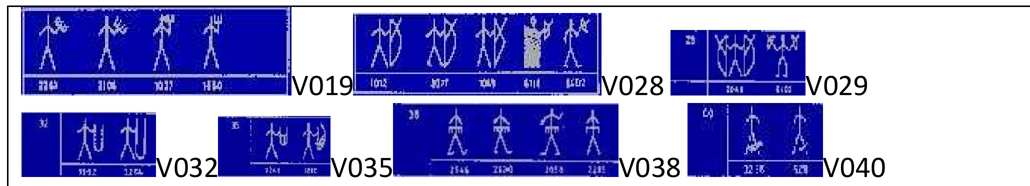
skeleton’, �*hā�a* ‘bamboo **framework** for decoration, build of one's body, body’; Mth. �*hā�* ‘bamboo frame of a thatch or of a mat house’; OAw. �*hā�a* m. ‘frame of a roof on which thatch is laid’; H. �*hā�h* m. ‘frame of a roof’, �*hā�ar* m. ‘bamboo frame’; G. �*hā�hũ* n. ‘**framework**, body’, �*hā�hũ* n. ‘skeleton’, �*hā�h�ī* f. ‘bamboo bier’; M. *thā�*, �*hā�* m. ‘frame of a roof’. (CDIAL 6089).

tha��ha—** 2 ‘pomp, ceremony’. [Same as *tha��ha—1 and < ta��á—??] Pk. *tha��a—* m.n. ‘pomp, ceremony’; S. ***�hā�*hu* m. ‘pomp’, L. �*ha��h* m., P. �*ha�h* f.; Ku. ***�hā�*** ‘pomp, glory, property’; N. �*hā�* ‘fashion’; A. ***�hā�*** ‘pomp, dignity’; B. ***�hā�*** ‘affectation’; H. ***�hā�****h* m. ‘pomp, posture, fashion, goods’; M. *tha��ẽ* ‘to act pompously’. (CDIAL 6090).

Rebus: brass, brass worker: ***�ha��h—** ‘strike’. [Onom.?] N. ***�ha�****āunu* ‘to strike, beat’, ***�ha�****āi* ‘striking’, ***�ha�****āk—�hu�uk* ‘noise of beating’; H. ***�ha�****hānā* ‘to beat’, ***�ha�****hāī* f. ‘noise of beating’. (CDIAL 5490).***�ha��ha—** 1 ‘brass’. [Onom. from noise of hammering brass?] N. ***�ha��****ar* ‘an alloy of copper and bell metal’. (CDIAL 5491). ***�ha��hakāra—** ‘brass worker’. 2. ***�ha��hakara—.** [*�HA��ha—1, kāra—1] 1. Pk. ***�ha��****hāra—* m., K. �*hõdotdot;�hur* m., S. �*hã�hāro* m., P. ***�ha�****hiār*, *°rā* m. 2. P. ludh. ***�ha�****herā* m., Ku. ***�ha�****hero* m., N. ***�ha�****ero*, Bi. ***�ha�****herā*, Mth. ***�ha�****heri*, H. ***�ha�****herā* m. (CDIAL 5493)

Glyptic elements which constitute ligatures to this hieroglyph (headless body) may be seen from the following illustrations of ‘sign glyphs’; each glyptic, ligaturing element is also a substantive related to the repertoire of a smithy/mint.





V019 V028 V029 V032 V035 V038 V040



V008 V017



har607 Steatite tablet, incised [1993-1995 excavations]



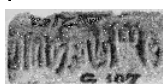
Pict-85 Standing person with horns and bovine features (hoofed legs and/or tail).

m0488Atm0488Btm0488Ct



2802 Prism: Tablet in bas-relief. Side b: Text +One-horned bull + standard. Side a: From R.: a composite animal; a person seated on a tree with a tiger below looking up at the person; a svastika within a square border; an elephant (Composite animal has the body of a ram, horns of a zebu, trunk of an elephant, hindlegs of a tiger and an upraised serpent-like tail). Side c: From R.: a horned person standing between two branches of a pipal tree; a ram; a horned person kneeling in adoration; a low pedestal with some offerings.

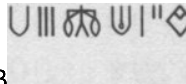
On side B of a tablet (h177), kneeling person is shown in prayer in front of a standing person under an arch decorated with a toran.a of ficus leaves.



h177A



h177B



4316 Pict-115: From R.—a person standing under an ornamental arch; a kneeling adorant; a ram with long curving horns.

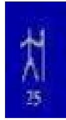


m1186Acolour



2430

There are some tablets where the standing person wearing a twig as headdress is within an ornamented arch decorated with *ficus religiosa* leaves (as in tablets: h238A, h242B, Pict-84 shown together with Text 4317, m1186 and h177B); *loa* '*ficus religiosa* ' is rebus for: *loh* '(iron) metal'.



dhad.a [Hem. Des. **tan.d.am**] headless trunk; the trunk as distinct from the head (G.) Vikalpa: Alternative homonyms: **ka_t.hi_** = body, person; **ka_t.hi_** the make of the body; the stature of a man (G.) Rebus: ka_t.i 'trench furnace'. **cola** = body, life; cola cabaentaea = he is dead; cola tahen bhor kami jarur.tabona = we must work on so long as we remain in the body (Santali) s'u_la = death, dying (Ka.)

Glyph: **t.ha_t.hum** = a frame-work, the body; t.ha_t.ha = state, dignity, pomp (G.) Hem. Des. t.ha_n.a = Skt. ma_nah pride, fr. Skt. stha_nam manner of standing, fr. stha_ 'to stand' (G.)

Rebus: **t.hat.era** = a brazier, a caste who manufacture and sell brass ware; t.hat.ori = a worker in brass, a goldsmith (Santali)

Rebus: **med.** iron, iron implements (Ho.) *me~rhe~t* 'iron'; *me~rhe~t icena* 'the iron is rusty'; *ispat me~rhe~t* 'steel', *dul me~rhe~t* 'cast iron'; *me~rhe~t khan.d.a* 'iron implements' (Santali) (Santali.lex.Bodding) bar.ae mer.ed – country smelted iron; bar.ae muruk = the energy of a blacksmith (Mundari.lex.) **mer.ed, me~r.ed** iron; **enga mer.ed** soft iron; **sand.i mer.ed** hard iron; **ispa_t mer.ed** steel; **dul mer.ed** cast iron; **i mer.ed** rusty iron, also the iron of which weights are cast; bicamer.ed iron extracted from stone ore; **balimer.ed** iron extracted from sand ore; **mer.ed-bica** = iron stone ore, in contrast to **bali-bica**, iron sand ore (Mu.lex.)

me_d.i = glomerous fig tree, ficus racemosa (Ka.); ficus glomerata (Te.); me_r.i (Kol.)(DEDR 5090).

mendi_ = eyelashes (Halbi); kandl mindig (pl.) eyelash (Kol.); mindi, mindi_ (Go.); kon.d.a-min.di eyelid, eyelash (Go.)(DEDR 4864). mitn.e~ = to close the eyes (M.)(CDIAL 10119).

mi~r.u~ = rimless, not having a rim (Santali.lex.)

me_l.amba = the black humble bee (Ka.); milind = a bee of the large black kind (Mar.); milinda = bee (Skt.)(DEDR 5098). [Note the black ant glyphs].

min.d.u = animal passion, sensual longing, lustiness; min.d.i = a lusty female; a woman of nubile age (Ka.lex.) me_n.t.ige = coupling, union (Tu.lex.) [Note coupling, copulating imageries]

me_n.te = a couple (Tu.lex.) mel.ai = couple (Kon.lex.) [Note pairing of signs; more importantly, note the pairing of animals: two scorpions (kamar, smithy), two antelopes (tagar, tin), two tigers (kol, smithy or forge), two short-horned bulls (d.an:gar, smith), two faces of one-horned bulls ligatured [vahur., worker (of a furnace/workshop, kod.)]. This pairing may be a rebus representation of an honorific, a titling by assigned function: **me_t.i** = an eminent person – a clause of purpose as in Santali; cf. **nahel menteye mak keda** = he cut it (a piece of timber) for a plough].

[Thus, when glyphs of an antelope or markhor with curving horns and a ficus leaf are shown, the rebus is: **me_t.i** = an eminent person, head servant; this may explain why a leaf glyph is ligatured with a special crowning on top of the grapheme; when a warrior is shown with a glyph depicting an eye-lash (as on an ivory plaque), the rebus is: **me_t.i**, **me_t.ari** an eminent person, hero, warrior. Note the ligature of leaf to the body, **me_ndur** = body; hence, the standing person sign may simply represent **me_ndur**, body].

Glyph: *med.ho* a ram, a sheep (G.); *mid.hia_o* (Dh.Des.); *men.d.h, men.d.* a ram (Skt.); *medhya* a goat; fr. *medh* a sacrifice (Skt.) **mr..eka** = goat (Te.); mlekh (Br.) **mer.h, mer.ha_,** me~d.ha_ ram (H.), med.hia_o (Dh.Des.) ram, goat, sheep (G) mid.iyo = having horns bent over forehead (G.)(CDIAL 10120). **me~r.a_, me~d.a_** = ram with curling horns (H.)(CDIAL 10120). me_t.am = goat (Ta.lex.) [cf. the pictorial motif of antelope with head turned backwards]. **merom me~t** = the goat's eye (Santali.lex.) **mes.a** = ram (RV 8.2.40) **mer.om** = a goat; mer.om jel = the hind of the ravine deer, *gazella bennettii*; mer.om (Santali)

mer.go = with horns twisted back; mer.ha, *m.,* mir.hi *f.=* twisted, crumpled, as a horn (Santali.lex.)

Glyph: tangle in cord or thread: **mer.hao** = v.a.m. entwine itself; wind round, wrap round roll up; mar.hna_ cover, encase (H) (Santali.lex.Bodding) [Note: the endless-knot motif may be a rebus representation of this semant. 'entwine itself']. **med.ha_** = curl, snarl, twist or tangle in cord or thread (M.); **meli, melika** = a turn, a twist, a loop, entanglement; **meliyu**, melivad.u, meligonu = to get twisted or entwined (Te.lex.) **merhao** = twist (Mun.d.ari) ***mē□□hī—** 'lock of hair, curl'. [Cf. **mē□□ha*—1 s.v. *mi□□a—] S. *mĩ□hī* f., *°□ho* m. 'braid in a woman's hair', L. *mẽ□hī* f.; G. *mĩ□l□*, *mi□°* m. 'braid of hair on a girl's forehead'; M. ***me□**hā* m. 'curl, snarl, twist or tangle in cord or thread'. (CDIAL 10312). Glyph: *malukku* slip-knot (Ta.); *malaku* a turn, twist, fold (Ka.); *mala-gonu* to be twisted; *maluku* a turn, slip-knot (Te.)(DEDR 4734).

The svastika glyph is associated with endless-knot glyph; the endless-knot glyph appears on a copper plate epigraph, indicating that both glyphs may connote the products made by metal-workers or equipment/processes involved in metal-work. [Svastika is sattiya, 'zinc'; endless-knot is: med.ha_ rebus: med. 'iron']


m1356 m443At m443Bt

Endless-knot motif appears on the following objects:

1. Rojdi ax-head or knife of copper;
2. Sumerian cylinder seal (circa 2500 BCE); and
3. Early Dynastic seal from Lagash.

Rojdi. Ax-head or knife of copper, 17.4 cm. long (After Possehl and Raval 1989: 162,

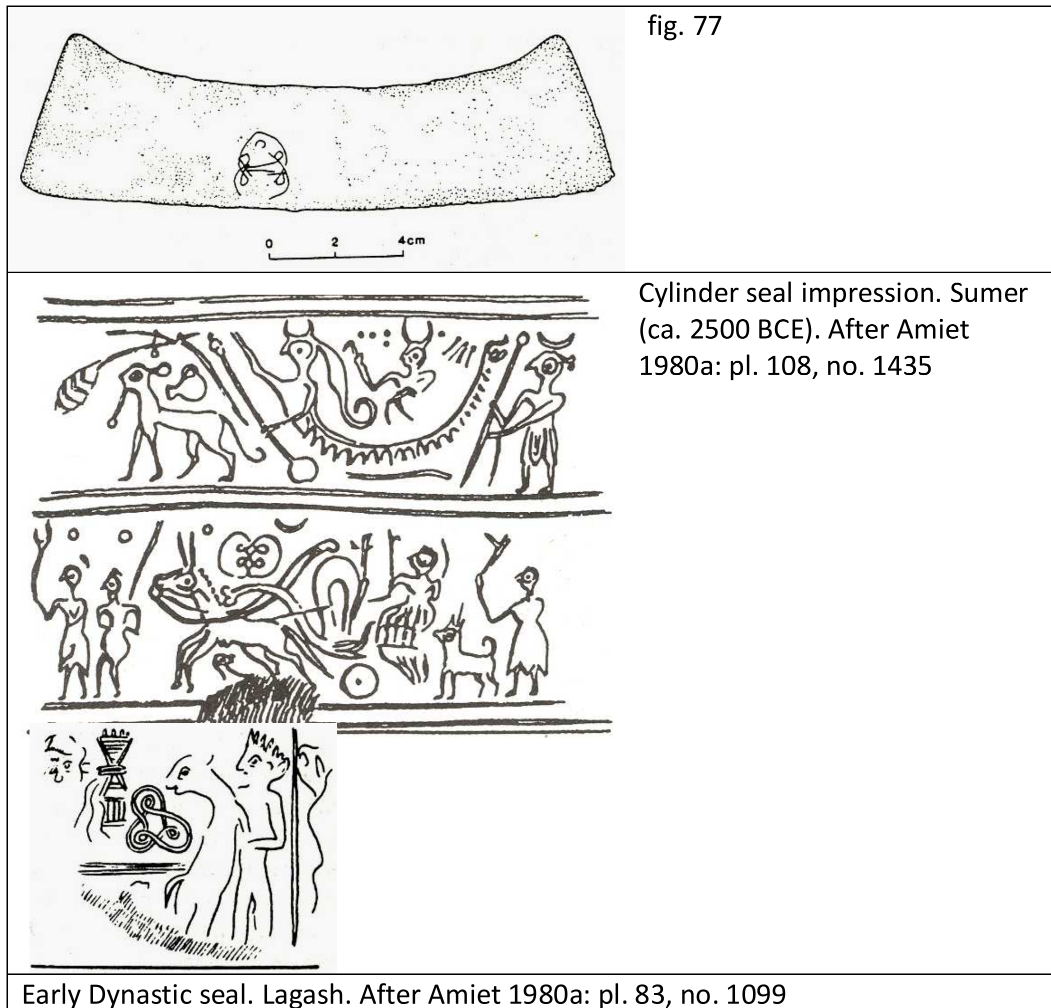


fig. 77

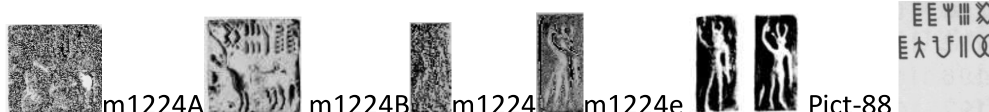
Cylinder seal impression. Sumer (ca. 2500 BCE). After Amiet 1980a: pl. 108, no. 1435

Early Dynastic seal. Lagash. After Amiet 1980a: pl. 83, no. 1099

One or more of the ligaturing elements which occur on glyphs showing horned persons: curved horns (like a ram's or like a buffalo's, sometimes with a pair of stars flanking the horns), twig or sprig adoring the headdress, plaited pigtails.

Sign 8 (105) 

A variant of Sign 8 is a horned, standing person ligatured to the buttocks of a bull. **d.hagara_m** = pl. the buttocks, hip (G.) Rebus: **d.han:gar** = blacksmith



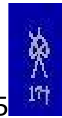
m1224A m1224B m1224 m1224e Pict-88

1227  4319 Standing person with horns and bovine features (hoofed legs and/or tail).

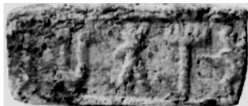
d.hagara_m 'thigh' (G.); rebus: **d.han:gar** 'blacksmith' (H.)

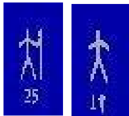
t.ha_n:kum = a skeleton (G.) ten:goc = to stand upright (Santali) **ten:go**, 'to stand'; ten:go, 'to assume responsibility (Santali) te_jate_ = is sharp, sharpens (RV); te_jati = is sharp, shapens, incites (Pali); te_ai sharpens (Pkt.); tevn.e~ = to shine, burn (M.)(CDIAL 5945). Te_jas = sharp edge of a knife, glow (RV); fiery energy (AV); te_h = fire, arrogance (K.)(CDIAL 5946) tega = a sword; tega_ = a scimitar (G.Persian) tega_r = property, substance (G.Persian)

t.a_n:kan.um = a chisel (G.); t.an:ka_ = an instrument for digging, khanitram (Hem.Des. G.)

m1653 ivory plaque 1905

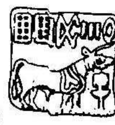
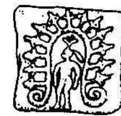
and.ren (pl. and.ran) male, man (Pe.); and.ra a male animal or bird, male (Kui); an.d.ra_ male (said only of animals)(Kur.); an.d.ya_ fierce, unmanageable (of bulls, bullocks, and male buffaloes)(Kur.); an.d.ya a bull (Malt.); an.d.i_ra male (Skt.); an.d.ira_ id. (Or.)(CDIAL 1111; DEDR App. 7). Rebus: aduru 'native metal'.

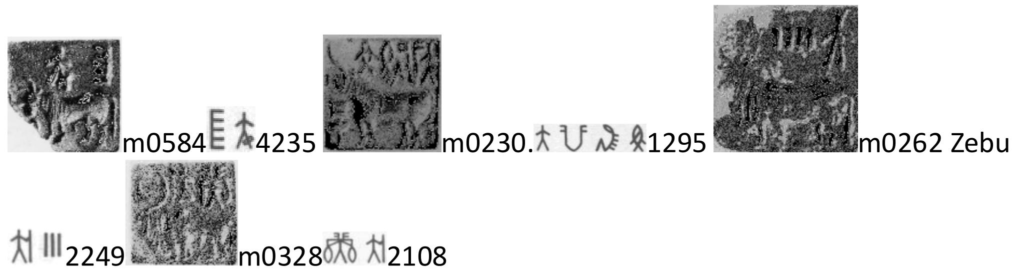
m450Atm450Bt2864 [One one side, the lizard is shown; and on the other, the monkey is shown; the epigraph seems to be the same. Thus, it is surmised that the same word may connote both 'monkey' and 'lizard': *dok*] Ths substantive is: possessions, occupancy: *dok*. *d.ok* the neck; *d.okum* the head (G.) [cf. the rings on the neck of a one-horned bull]

Glyph: *d.agalum* 'a step, the distance between the two feet in walking; a pace (G.) *ta_k* to walk (Pa.Go.); *ta_n:g* to walk (Pe.); *ta_n:, ta_ka* act of walking (Mand.)(DEDR 3151). *t.an:kam* mace (Ma.); *t.an:ke, d.an:ke, d.an:gi, d.an:ge* staff, cudgel (Ka.)(DEDR 2941).
Glyph: *d.okke* the body (Ka.)(DEDR 2976).

Glyph is: *me~_d, me_d* 'body' (Kur.); *meth* body (Malt)(DEDR 5099). Sign 1 occurs 131 times on epigraphs. Rebus: med. 'iron'.

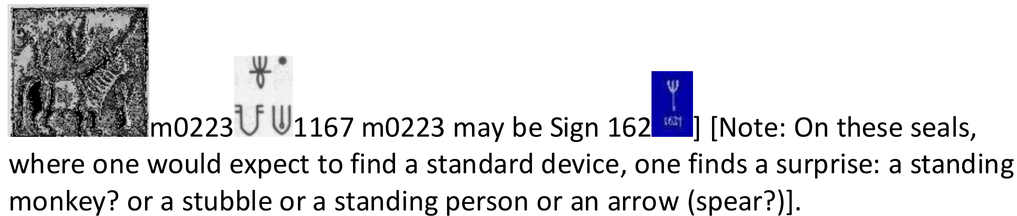
Vikalpa: Standing person with horns: *ka_d.i* 'body'; *ka_t.i* 'furnace'

h858Ath858Bth858Ct    7.09
Moulded tablet 2 sides



m0584 4235 m0230. 1295 m0262 Zebu

2249 m0328 2108



m0223 1167 m0223 may be Sign 162] [Note: On these seals, where one would expect to find a standard device, one finds a surprise: a standing monkey? or a stubble or a standing person or an arrow (spear?)].



Chanhudaro17a 6122 Banawali 3

Mohenjodaro FEM, Pl. LXXXVIII, 316 2316

[The sign in front of the one-horned bull on seal m0223 may be Sign 162] [Note: On these seals, where one would expect to find a standard device, one finds a surprise: a standing monkey? or a stubble or a standing person or an arrow (spear?)].

Glyph: *ad.aru* twig (Tu.Ka.)(DEDR 67) The twigs worn on the seven standing persons

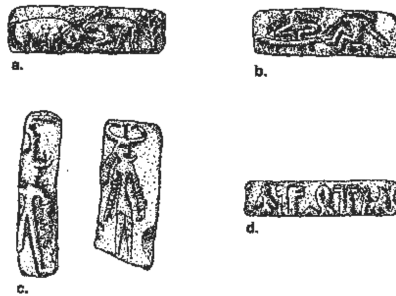


may connote 7 copper (*era*) metal (*aduru*) furnaces: *kaccu* a kind of corslet worn by Indian women in ancient times (Ta.); bodice to confine the breast (Ma.); ?< *kan~cuka* (Skt.)(DEDR 1098) If the early form is *kan~cu* it may be rebus for: *kamsa, kasa* 'bronze'. Hence, the seven robed persons may connote: metal bronze pit-furnaces (*aduru, kamsa*) cf. *khanta gad.a* a pit from which earth has been dug out (Santali)

ka_nta woman (Skt.)

Slide 142. Molded tablets from Trench 11 sometimes have impressions on one, two, three or four sides. This group of molded tablets shows the complete set of motifs. One side is comprised entirely of script and has six characters, the first of which (on the very top) appears to be some sort of animal. A second side shows a human figure grappling with a short horned bull. A small plant with at least six branches is discernible behind the individual. The third panel portrays a figure seated on a charpoy or throne in a yogic position, with arms resting on the knees. Both arms are covered with bangles, and traces of a horned headdress and long hair are visible on some of the impressions. A second individual, also with long hair and wearing

bangles, is seated on a short stool to the proper left of the individual on the "throne." The fourth panel shows a deity standing with both feet on the ground and wearing a horned headdress. A branch with three pipal leaves projects from the center of the headdress. Bangles on seen on both arms.



Harappa. A series of small tablets. A. man fighting a short-horned bull; a small plant with six branches; b. seated figure in yogic posture with arms resting on knees; both arms covered with bangles; traces of a horned headdress and long hair are visible on some impressions; a second individual, also with long hair and wearing bangles, sits on a short stool; ; c. standing deity with horned headdress with a curved branch with three projecting leaves; bangles visible on both arms; d. inscription with six signs; the first sign appears to be some form of an animal; the last shows a person.

To hit with fist (tablet showing man fighting with bull): *kud.rau*; Rebus: *kod.rao* 'to scrape out, to gouge out' hence, scraper.



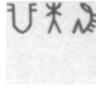
m0304AC The importance of the 'body' glyph is seen in the Seal m0304 Text  2420 where the glyph appears together with the glyphs of: buffalo, tiger, rhinoceros and elephant, all surrounding the horned, seated person. A pair of 'antelopes' also adorn the platform on which the person is seated in a yogic posture.



h363A h363B h363C h363E Pict-86 Pict-85 Standing person with horns and bovine features (hoofed legs and/or tail).



5471 h175A h175B Pict-87 4319 Standing person with horns and bovine features (hoofed legs and/or tail).

h179A h179B 4307 Pict-83: Person wearing a diadem or tall head-dress standing within an ornamented arch; there are two stars on either side, at the bottom of the arch.

The twig or tree branch or feather(s) ligatured to the head of the composite motif may connote a possession of a blacksmith or coppersmith.



H178B tablet with epigraph shows a person ligatured to the back of a bovine; the person also wears a twig as a head-dress.

h178B  4318 Pict-84: Person ligatured to the back of a bovine with tail, wearing a diadem or tall head-dress (with twig?) standing within an arch or two pillars?

Glyph: back of a bovine

Substantive: **d.ha~_gar., dha~_gar** blacksmith; digger of wells (H.)

d.hagara_m pl. the buttocks; the hips (G.lex.) [Note the glyphs ligaturing other glyphs such as a man's body to the buttocks or hips of a bull]. d.aka_ waist (Wg.); da~k, d.an: back (Dm.); d.a~g (Shum.); dha~_k back (Kal.); d(h)a_k back (Bshk.); d.ha_k hip (L.); d.ha_ka (S.); side, hip (P.)(CDIAL 5582). t.an:ke, t.an:ka_ = the leg (Ka.) t.an:ka = leg (Skt.); t.an:g projecting spike which acts as a bolt at one corner of a door (K.); t.a_n:o rod, fishing rod (N.); t.a~_k iron pin, rivet (H.); t.am.ka leg (Pkt.); t.a_n:ka leg, thigh; t.a_n:ku thigh, buttock (Or.); t.a~_n:, ten:ri leg, thigh (B.); t.a~_g, t.a~gri leg, foot (Mth.); t.a_n:, t.an:ari leg (Bhoj.); t.a~_g (Aw.H.M.leg from hip to foot (G.)(CDIAL 5428) [Note the dotted circles inscribed on the leg from hip to foot of a seated woman].

mandil, mandir = temple (Santali) ma_d.a = shrine of a demon (Tu.); ma_d.ia = house (Pkt.); ma_l.a a sort of pavilion (Pali); ma_l.ikai = temple (Ta.)(DEDR 4796). **ma_d.a** = pavilion (Te.)

man.d.a_ = workshop (Kon.)


h238A h242A h242B Pict-84

4317 h242A has svastika in the middle in a square enclosure.

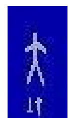
Substantives: *aduru* 'native metal'; **cul.l.ai** = kiln, furnace; rebus: **cul.l.i** = sprig, branch

*ad.rna_* to twist back one's limbs or bend the body inward (as under threat of a blow)(Kur.); *ad.re* to strut; *ad.ro* a swaggerer (Malt.)(DEDR 108). [cf. the glyphs of antelope and tiger with their heads turned backwards.]

ad.aru twig; ad.iri small and thin branch of a tree*; ad.ari* small branches (Ka.); *ad.aru* twig (Tu.)(DEDR 67). Cf. **at.artti** = thickly grown as with bushes and branches (Ta.) *d.ar a* branch; *dare* a tree; a plant; to grow well; ban: *darelena* it did not grow well; *toa dare* mother, the support of life (Santali)

Thus, the glyph of a standing person with other glyptic features of the back of a bovine, twig and ficus-leaved-arch can be explained as: *d.ha~gar* 'smith'; *aduru* 'native metal'; *loh* 'iron'; that is, a blacksmith working with iron and native metal (maybe, natural copper + arsenic alloy).

ten:go ten:gon = to assume responsibility to appoint (Santali) [The rebus representation of 'standing person' pictograph can thus be interpreted as a functionary related to the ligatured pictograph (and related substantive rebus)].


ten:goc = standing person (Santali) t.ha_n:kum = a skeleton (G.) ten:go, ten:gon = to stand, to stand still, to assume an upright or perpendicular position, to raise to an upright position (Santali) ten:gen = to kill for sacrifice by cutting off the head with a knife (Santali) [Note the orthography of Sign 1 and many variants is that of a headless body.] Rebus: ten:go ten:gon = to assume responsibility to appoint (Santali) [The rebus representation of 'standing person' pictograph can thus be interpreted as a functionary related to the ligatured pictograph (and related substantive rebus)].

ten:gra hako = a species of fish (Santali)

bhat.a = a warrior (G.lex.) bhad.a a warrior; a hero; adj. Strong, mighty; opulent; an opulent person (G.lex.) **bhar.** = soldier (B.); warrior (G.); hero, brave man (Ku.); bhat.a = hired soldier (MBh.) pat.ai = army, weapons, battle (Ta.); pat.a = battle, army (Ma); pad.eyila = soldier (Ka.); pad.eval.a = a general (Ka.); pad.ava = fight, battle; pad.avalamu = van of an army; pad.ava_lu = commander of an army (Te.)

m0299 Composite animal with the body of a ram, horns of a bull, trunk of an elephant, hindlegs of a tiger and an upraise serpent-like tail. 1381
Glyph: *pahar, pahra* guard (Santali) *bhad.a* a warrior, a hero (G.); *bhat.a* warrior (Skt.)
Substantive: *bhat.a* furnace, kiln (Santali)

Substantive: *mandar* 'the headman of a village'; *man.d.wari* 'the Marwari caste of hindus'

man.d.ao 'to occupy a new house, to take up one's residence'; *man.d.hwa, man.d.ua, man.d.wa* 'a temporary shed or booth erected on the occasion of a marriage'; *man.d.om* 'a raised platform or scaffold'; *ma~r.om* 'a platform, used to keep straw on, or from which to watch crops' (Santali)

Glyph: seated: *asan man.d.ao* 'to sit tailor-wise for a long time, to sit about with nothing to do; lazy; to lie down, as an animal in its lair'; *asan man.d.ao akanae, hokrho kan leka* 'he has taken up his position as if he were a watchman' (Santali) *mat.ku* squat, squab, fat and short (Santali) *asan man.d.ao, pat.gan.d.o* to squat, to sit tailorwise (Santali)

ma_d.a = shrine of a demon (Tu.); ma_d.ia = house (Pkt.); ma_l.a a sort of pavilion (Pali); ma_l.ikai = temple (Ta.)(DEDR 4796).

Glyph: *mandar.i, mandar.ia* 'a drummer, drum musicians' (Santali)

Te. **me��u** abundance, plenty, much, a good or great deal; abundant, plentiful, ample, much, great. ***Go.*** (Tr.) **mēn� (*obl.* mē�-, *pl.* mēhk)** full (used suffixally, e.g. **�oppō-mēn�** a leafplate full); (W. Ph.) **mē�** full, whole, entire, complete; (Mu.) **men� (*pl.* mehk)** id., e.g. **gappa men� (*pl.* gappa mehk)** basketful; (Mu.) **me�aŋ** having the total of; (Ma.) **nār� men�u** the whole village; **nār� me�or** all the people of the village (DEDR 5060).

ma��ūra—2 'bodily defective' RV., 'rust of iron' (CDIAL 9723). OP. *manūru* m. 'scrap iron, iron dross, slag' (CDIAL 9754).

Te. **ma��u** great heat, redhot iron, brand; very hot; ***Ta.*** **ma��u (ma��i-)** to blaze up, glow; **ma�u (-pp-, -tt-)** to kindle. ***Te.*** **ma��u** to burn, blaze, flame, cause or produce a burning pain, be angry, be in a fury or violent rage, be envious; **ma��a** flame, blaze, burning pain, anger, wrath, fury, envy; **ma��incu** to burn (***tr.***), inflame, provoke, irritate; **mrandu** to be consumed by fire, burn. ***Kol.*** (Pat., p. 167) **man�eng** to burn, scorch *(intr.). Nk.* **man�-** to burn *(intr.). Go.* (M.) **ma�gānā** to blaze; (Ma.) **ma�g-** to burn ***(intr.) (Voc.*** 2745); (Tr.) **ma�ūstānā** to cook in oil (***Voc.*** 2743); (ASu.) **ma�ū-** (curry) to be charred. ***Kui*** **m�ahpa (m�aht-)** to consume by fire, burn; ***n.*** destruction by fire. (DEDR 4680).

ma — ‘some sort of framework (?)’. [In *nau—maḗ* n. du. ‘the two sets of poles rising from the thwarts or the two bamboo covers of a boat (?)’ ŚBr. (as illustrated in BPL p. 42); and in BHSk. and Pa. *bōdhi—**ma*** — n. perh. ‘thatched cover’ rather than ‘raised platform’ (BHS ii 402). *mãā* m. pl. ‘shed, resthouse’ (CDIAL 9737).

man.d.a_ = warehouse, workshop (Kon.lex.) *man.n.u* to do, perform, adorn, decorate, polish (Ta.); *man.ai* to create, fashion (Ta.); *manayuka, maniyuka* to fashion, form earthenware, make as a potter (Ma.)(DEDR 4685). *man.i* jewel of office (Skt.); *man.iyam* office of the village headman (Ta.); superintendence of temples, palaces, villages (Ma.); *man.e.v, man.ye.v* the office of monegar (Ko.); *man.iya, man.iha, man.eya, man.e* superintendence of temples, maths, palaces, custom-houses (Ka.); *man.iga_re* revenue inspector (Tu.); *man.iyamu* office or duties of the manager of a temple (Te.)(DEDR 4674).

Glyph: platform: *man.d.hwa, man.d.ua, man.d.wa* ‘a temporary shed or booth erected on the occasion of a marriage’; *man.d.om* ‘a raised platform or scaffold’; *ma~r.om* ‘a platform, used to keep straw on, or from which to watch crops’ (Santali) *man.ai* low wooden seat, low earthen dais, wooden base of cutting instyruments, footstool (Ta.); *man.i, man.e* stool, low bench, seat (Ka.); *man.e* low stool to sit upon (Tu.)(DEDR 4675).

maha— 1 m. ‘hut, cottage, esp. cell of an ascetic’ MBh., *mahikā—* f. Daś. Pk. *maha—* m.n., *°hī—* f. ‘hut’; K. *mar* m. ‘hut’, *moru* m. ‘dove—cot, fowl—house’; S. *mahu* m. ‘place of residence’, *mahī* f. ‘place where an ascetic lives’; L. *mahī* f., mult. *mahī* f. ‘small tomb over ashes of a Hindu’; P. *mah* m., *mahī* f. ‘monument, tomb’; Ku. *maī* f. ‘hut’, *maulī* f. ‘shed’; N. *mar*(*h*)*o* ‘any temporary erection’; A. *marā* ‘tuft of grass at either end of ridge- pole of a house’; Or. *maiā* ‘hut’; Bi. *maraī* ‘grass hut’, (Patna) *marukā* ‘shed on threshing floor’; Mth. *mahī* ‘hut, house’, *mahahī* ‘forest hut’; H. *mahā*, *mahā*, *mãhā* m. ‘open hut or shed’, *mahī* f. ‘cottage, hut, shed, cell, small temple’; G. *mah* m. ‘temple’, *mahī*, *°huī* f. ‘hut’, M. *mah* m., *mahī* f.; Si. *mau—vā* ‘hut’. (CDIAL 9727).

mapa— m.n. ‘open temporary shed, pavilion’ Hariv., *°pikā—* f. ‘small pavilion, customs house’ Kād. 2. **mapa—** m.n. lex. 3. ***mahaka—.** [Variation of with supports supposition of non-Aryan origin in Wackernagel AiGr ii 2, 212: see EWA ii 557. — Prob. of same origin as maha—1 and MAA—6 with which NIA. words largely collide in meaning and form] 1. Pa. ***ma**apa—* m. ‘temporary shed for festive occasions’; Pk. *maṁava—* m. ‘temporary erection, booth covered with creepers’, *°viā—* f. ‘small do.’; Phal. ***ma**u* m. ‘wooden gallery outside a house’; K. *manav* m. ‘a kind of house found in forest villages’; S. *manahũ* m. ‘shed, thatched roof’; Ku. *mãyā*, *manyā* ‘resthouse’; N. *kāhmãau* ‘the city of Kathmandu’ (*kāh—* < kāhá—); Or. *mauã* ‘raised and shaded pavilion’, *paā—maoi* ‘pavilion laid over with planks below roof’, *muoi*, *°ei* ‘raised unroofed platform’; Bi. *mão* ‘roof of betel plantation’, *mãuā*, *ma°*, *malwā* ‘lean—to thatch against a wall’, *maaī* ‘watcher's shed on ground without platform’; Mth. *māab* ‘roof of betel plantation’, *mawā* ‘open erection in courtyard for festive occa- sions’; OAw. *māṁava* m.

‘wedding canopy’; H. *mā̃wā* m., *°wī* f., *mawā* m., *°wī* f. ‘arbour, temporary erection, pavilion’, OMarw. *maṁavo*, *māhivo* m.; G. *mā̃av* m. ‘thatched open shed’, *mā̃v* m. ‘booth’, *mā̃vī* f. ‘slightly raised platform before door of a house, customs house’, *mā̃aviy* m. ‘member of bride's party’; M. *mā̃av* m. ‘pavilion for festivals’, *mā̃vī* f. ‘small canopy over an idol’; Si. *mau—va* ‘hut’, *maa* ‘open hall’ SigGr ii 452. 2. Ko. *māṁav* ‘open pavilion’. 3. H. *mā̃hā*, *māhā*, *mā̃hā* m. ‘temporary shed, arbour’ (cf. OMarw. *māhivo* in 1); — Ku. *mā̃ā* m.pl. ‘shed, resthouse’ (CDIAL 9740).

Ta.* maai** mendicant's begging bowl, earthen vessel, head, skull, cranium, brain-pan, top portion as of palms, a standard of measure. ***Ma.* maa** skull; similar objects. ***Ko.* ma** head. ***To.* ma** id. ***Ka.* mae** id.; (Hav.) **maage** a big jar. ***Ko.* mae** head. ***Tu.* maè** large earthen vessel, skull, head. ***Kor. (M.) **maa**, (O. T.) **mane** head. Cf. 4678 Kona **mai**. / Cf. Skt. (*lex.*) **maa-** head. (DEDR 4682).
man.d.iga **= an earthen dish (Te.lex.) man.d.e = a large earthen vessel (Tu.lex.) man.di earthen pan, a covering dish (Kond.a); cooking pot (Pe.); brass bowl (Kui); basin, plate (Kuwi)(DEDR 4678). man.d.e = head (Kod.)(DEDR 4682).**
man.d.a = a branch; a twig (Te.lex.)

maa— 2 m. ‘ornament’ lex. [√ma] Pk. *maṁaya—* ‘adorning’; Ash. *mōa*, *mōnda*, *mūnda* NTS ii 266, *mō* NTS vii 99 ‘clothes’; G. *mā̃* m. ‘arrangement, disposition, vessels or pots for decoration’, *mā* f. ‘beautiful array of household vessels’; M. *mā̃* m. ‘array of instruments &c.’; Si. *maa—ya* ‘adornment, ornament’. (CDIAL 9736).

(*b*) ***Ka.* mandi, mande** persons, people. ***Tu.* mandi, mandè** id. ***Te.* mandi** crowd, collection of persons; retinue, following, infantry. ***Kol.*** (SR.) **mandī** men; (Kin.) **mandi** man. ***Pe.* mandanakar, madanakar** people belonging to the same side or party. (DEDR 4700).

***Ta.* mau** hall of assembly, golden hall of Chidambaram, court of justice, arbitration court, cow-stall, herd of cows, raised platform under a tree for village meet- ings, centre of a garden, junction of four roads or streets; **maam** hall, assembly, court, meeting place under a tree in a village, open space used for riding horses, plain, open space, central place in a battlefield, Chidam- baram, house, cowshed, long street; **maal** marriage, long street; **maa** Śiva; **ma-il** courtyard of a house; **mau (mai-)** to fine, punish. ***Ma.* mannu** place of judgement or assembly; **mannam** standing place, place of judgment or discussion. ***Ko.* man** Toda mund (i.e. village); burning place for dry funeral; **mandm (*obl.* mandt-)** meeting. ***To.* mo (*obl.* mot-)** locus of tribal activity, including village with dairy, dairy apart from village, and funeral place; patrilineal clan. ***Ka.* mandu** hamlet of the Todas on the Nilagiri. ***Ko.* mandï** village green. (DEDR 4777).
(a) Ka.* mii** to leap, bounce, hop; make fly; **mīu** to jump, bounce; **mīu** jumping, flying. ***Te.* miiyu** to flash or fly off (as a chip), jump, leap forward; **miu** to jump, leap; (K.) **miuku** id.; (K.) **meuku** to frisk, leap. ***Kol.* mi- (mit-)** to leap. ***Nk.* mi-** to jump. ***Go. (M. Ko.) **mirr-** to run; (M.) **mirānā** to flee (***Voc.*** 2840). ***(b) Ko.* mi** locust. ***To.* mu** grasshopper. ***Ka.* mice, mite, miate, mucu** grass- hopper,

locust. ***Tu.*** **mo��è** grasshopper. ***Te.*** **mi�uta, mi�ata** id. ***Kol.*** **mi��e** id. ***Pa.*** (S.) **mi�aka** id. ***Ta.*** **ve��ukki�i** large grasshopper, locust; **vi��il** locust. ***Ma.*** **vi��il, ve��il** grass-hopper, locust. / Cf. Skt. **ma�acī-** locust (?; G. A. Jacob, *JRAS*, 1911, 510). (DEDR 4850).

Ta. **mi�a�u** neck, trachea, windpipe, throat; a draught. ***Ma.*** **mi�a�u** throat; a draught, gulp; **mi�ila** throat. ***Ko.*** **mi�** front of neck; neck of pot. ***To.*** **mï�** (*obl.* **mï�-, mï�t-**) neck. ***Ka.*** **me�re** throat. ***Te.*** **me�a** neck, shoulders; **me�a-kāya**, (Merolu) **mi�su** neck. ? ***Go.*** (Tr.) **warē�** id.; (L.) **ve�er** id., throat; **ve�orī** neck; **ve�āgā** throat; (Mu.) **va�er**, (Ma.) **ve�er�** id. (***Voc.*** 3287) (or with 5547 Ma. **vē�a**). *Kon�a* **me�a** neck; (BB 1972) **��eki** throat (? aphaeresis of **m-**). / Cf. Pkt. (*DNM*) **ma�a-** neck. (DEDR 4847).

OA *me�ha*, *mehra* 'a circular con- struction, mound'; Or. *me�hī*, *meri* 'post on threshing floor'; Bi. *mẽ�* 'raised bank between irrigated beds', (Camparam) *mẽ�hā* 'bullock next the post', Mth. (SETirhut) *mẽ�hā* 'id.'; M. ***me�***(*h*), ***me�****hī* f., ***me�****hā* m. 'post, forked stake'. (CDIAL 10317). ***Ta.*** **mē�ai** platform, raised floor, artificial mound, terraced house. ***Ma.*** **mē�a** raised place, tower, upper story, palace. ***Te.*** **mē�a** house with two or more stories, upper chamber. ***Pa.*** **mē� ole** bungalow. ***Go.*** (Ko.) **mē�ā** large house, bungalow (***Voc.*** 2965). ***Kon�a*** **mē�a mide** terraced building (see 5069). ***Pe.*** **mē�** storied house, mansion. ***Kuwi*** (S.) **mē�a illu** storied house; (Isr.) **mē�a** upstair building. / Cf. Skt. (*lex.*) **me�a-** whitewashed storied house; Pkt. **me�aya-** id. (DEDR 4796).

Ta. **ma��i** kneeling, kneeling on one knee as an archer. ***Ma.*** **ma��uka** to be seated on the heels. ***Ka.*** **ma��i** what is bent, the knee. ***Tu.*** **ma��i** knee. ***Te.*** **ma��&ibrevmacr;** kneeling on one knee. ***Pa.*** **ma�tel** knee; **ma�i ku�tel** kneeling position. ***Go.*** (L.) **me��ā**, (G. Mu. Ma.) **min�a** knee (***Voc.*** 2827). ***Kon�a*** (BB) **me�a, me��a** id. ***Pe.*** **men�a** id. ***Man�.*** **men�e** id. ***Kui*** **men�a** id. ***Kuwi*** (F.) **menda**, (S. Su. P.) **men�a**, (Isr.) **me��a** id. Cf. 4645 Ta. **ma�a�ku (ma�i**-forms). / ? Cf. Skt. **ma��ūkī-** part of an elephant's hind leg; Mar. **me�** knee-joint. (DEDR 4677).

Ta. **mē�i** body, shape, colour, beauty; **mēl** body. ***Ma.*** **mēni** body, shape, beauty, excellence; **mēl** body. ***Ko�.*** **mlï** body. ***Te.*** **mēnu** id.; **mēni** brilliancy, lustre; belonging to the body, bodily, personal. ***Kol.*** **mn (*pl.* mn�l)** body. ***Nk.*** **mēn (*pl.* mēnu�)** id. ***Nk. (Ch.)*** **mēn** id. ***Pa.*** **mēn (*pl.* mēnul)** id. ***Ga.*** (S.) **mēnu (*pl.* mēngil)**, (P.) **mēn** id. ***Go.*** (Tr.) **mēndur (*obl.* mēndu�-)**, (A. Y. W. M.) **mēndul**, (L.) **me��ul**, (SR.) **me��ol** id. ***Kon�a*** **mēndol** human body. ***Kur.*** **me~d, mēd** body, womb, back. ***Malt.*** **méth** body. (DEDR 5099).

Kol. **ms** man; (SR.) **mās**, (Kin.) **māc** husband; **msal (*pl.* msasil)**, (SR.) **māsā**, (Kin.) **māca** wife. ***Nk.*** **mās** man; **māsal** woman. *Nk. (Ch.)* **mās** husband; **māsa** wife. ***Pa.*** **mañja**, (S.) **maññа** man. ***Go.*** (Mu.) **manja** man, human being (***Voc.*** 2684); (Tr.) **mai**, (W.) **māi, maiyū**, (Mand.) **māyi** woman, wife (***Voc.*** 2796). *Kon�a* **māsi (*pl.* -r)** husband; **āl māsir** husband and wife; (Sova dial.) **mēmar ko�o** boy-child; (BB) **mē-mari (*pl.* mē-marŋu)** husband (for **mar(i)**, see 4764). ***Kur.*** **me~t, mēt** adult man, husband;

mai~macr; female child; way of addressing girls younger than the speaker. ? ***Ta.* māntar** **human** beings, male persons. (DEDR 4791).

manu�yà— '**human**', m. '**human** being, man' RV. [Collides in various degrees with púru�a— and also has various degrees of shortening, due prob. to use as a term of relationahip and address. — mánu�a—] Pa. *manussa*— m. 'man', Aś.shah. man. *manuśa*—, gir. *manusa*—, kāl. *manu�a*—, NiDoc. *maṁnuśa*, Pk. *ma�ussa*—, *ma�ūsa*— m., Gy. arm. *manus* (or < mắnu�a—), pal. *mánŭs*, pers. *mônęss*, Wo�. *maniš* m.; L. *ma�us* 'man', *mú�as* m. 'husband', mult. *mu�s*, *mu�s*, awā�. *mu�us*, P. *munas*, *muns*, *muns��* m., WPah. bhad. *mu�aś*, cur. *mu�ś*; Bi. Mth. *manus* 'man, person'. — X púru�a—: Gy. eur. *murš* 'man, brave young man, boy'; S. *mursu* m. 'man, husband', L.khet. *murs*; — Pr. *muš*, *mūšū* (or < mártya—?); Sh.gil. *mušắ* 'man', koh. pales. jij. *mušā* 'husband', Ku. *muso.* — X MIA. *purisa*— s.v. púru�a—: Aś.dh. jau. and all E inscrr. *munisa*—, WPah.bhal. *miniś* 'man', *m* e *�ś* 'husband'; A. *munih* 'man, hired farmworker'; B. *munis* 'day labourer', *minsā* 'fellow (contemptuous)'; Or. *ma�isa* 'man, servant, labourer', *pilā m°* 'a mere child', (Sambhalpur) *munus*, (Medinīpur) *munisa* 'labourer'; Ko. *munis* 'man'; Si. *minisā*, *minihā* 'man', *miniya*, *minī* 'corpse'; Md. *mīhu* 'man'; — Bshk. *mīš*, *m�š* 'young man, husband' (pl. *mānuš*); Sv. *miš* 'husband', Phal. *mēš*, *mīš* (pl. *mōša*, *māš�*), Ku. *mais*; — with unexpl. —*s*—: Shum. *ma�ša*, *°se* 'man', Ni�g. *mais�.* — X mắnu�a- or poss. mártya—: Dm. *mâš* 'men' (pl. of *mač* < *mártya*—); Kho. *moš* 'man, husband', Mai. "*māsh*", WPah.bhal. *mā̃ś* (after which *�h�ā̃ś* 'woman' ~ str�— in *�h�ā̃ś—miniś* 'woman and man'). — Corresponding feminine forms (cf. *mānu�ī*— f. MBh., *manu�ī*— f. lex.): Wg. *mõmacrdotdot;šī* 'wife, woman' (NTS xvii 279 poss. < **mā̃syakī*—), Paš.lau�. *māšī*, chil. *mõmacr;šī*, Shum. *mā̃išī*, Gaw. *maš�* Addenda: **manu�yà—:** Garh. *ma�sa* 'man' (pl.?); Md. *mini—kiru* 'breast milk', *mini—marā* 'executing'; *mīs*, *mīhā* (pl. *mīhun*) 'man, people'; Kho. *moš* 'man'? BKhoT 71. (CDIAL 9828). **manu�yatvá—** n. 'manhood, **human**ity' TBr. [ma- nu�yà—] Pa. *manussatta*— n. 'manhood'; Si. *minisat—bava* 'state of **human**ity'. (CDIAL 9829). **mānavá—,** f. *°v�*— '**human**', m. 'man' RV., *mā�avá*— m. 'youth, little fellow' Kāty., *°vaka*— m. Gobh. [—�— early MIA. change or poss. infl. by 'defective' word **mā�a*- s.v. group *ma��a—. — mánu—] Pa. *mānavikā*— f. 'young Brahman girl', *mā�ava*—, *°vaka*— m. 'young man (esp. Brahman)', *nāga—mā�a- vaka*— m., *°vikā*— f. 'young snake'; Pk. *mā�ava*— m. 'man'; Ku. *mā�o*, *°�ī* 'man without beard or mustache' (but see **mā�a*— s.v. *ma��a—); OB. *mā��* 'man', (Maimansigh) *mān* ODBL 737, (Haijong) *māna* ODBL 347; Si. *manvā*, st. *manav*— 'man, person'; - < **mānavika*—: Bhoj. Aw.lakh. *manaī* 'man'; H. *manaī* m. 'man, husband, bridegroom'. (CDIAL 10048). **mắnu�a—,** f. *°�ī*— '**human**', m. 'man' RV. [mánu�a—] Pa. *mānusa*— m. 'man', *°aka*— '**human**', n. pl. '**human** beings', Aś.gir. gav. *mānusa*—, Pk. *mā�usa*— m.; Gy. eur. *manuš* 'man, Gypsy', arm. *manus* (or < manu�yà—), Wg. *mana�*, Gmb. *mada�* (both altern. < mánu�a—), Wo�. *mắne��* NTS xvi 130 (Buddruss Wo� 113 *maníš* < manu�yà—?), Dm. Gaw. *mānu�*, Bshk. *mắnuš* pl., Sv. *mānu�*, Phal. *mōnu�*, K.rām. *māh�*, pog. *mohan*, kash. *māhnŭ*, �o�. *māh�ŭ*; S. *mā�hũ*, *mā�hũ* m. 'man, person', *mā�huā�o*, *mā�hiko* '**human**'; P. *mā�as* m. 'man' (← E or S), kgr. *māh�ū* m., �og. *mānũ*, WPah.pā�. *mauh�u*, pa�. *māh�ū*, sirm. *mā�aś* (see below), cur. *mā�s*, N. *mānis* (*i* from MIA. *purisa*— ~ púru�a—?), A. *mānuh*, B. Mth. Bhoj. *mānus*, OAw. *mānusa* m., lakh. *mansawā* 'husband', H. *mānus*, *°nas* m., OMarw. *mā̃�asa* m., OG. *mā�isa* m.

(for *i* see N. above), G. *mā�as* m., M. *mā�ūs* m. — In WPah. sirm. *mā�ach*, *mãch* (beside *mā�aś*), (Joshi) *māch* (s.v. mártya—), and N. *mānche* (beside *mānis*) —*nch*— is < —*nś*—. ámānu�a—. Addenda: **mānu�a—:** S.kcch. *mā�ū* m. 'man', WPah.k�g. *ma�u* m. '**human** being, man', pl. 'wife and children, family', J. *mā�u* m.; — *nś* > *ñch*: k�g. *ma��ch*, *má�ch* m. (CDIAL 10049). WPah.k�g. *ma�chénnh* f. 'smell of **human** beings' (Him.I 172) (CDIAL 10049a).

pauru�á— 'manly' ŚBr., n. 'manly strength' MBh. [púru�a—] Pa. *pōrisa*— '**human**', m. 'servant', n. '**human** activity, height of a man'; Pk. *pōrusa*—, *pōrisa*— n. 'manly deed'; Bi. *porsā* 'height of a man'; G. *p�ras* m. 'pride, delight'. (CDIAL 8421).

paúru�ēya— '**human**' RV., n. 'work of a man' AV. [pauru�á—] S. *porhyo* m. 'labour, price of labour, wages'; L. *porheā* m. 'labour for wages'. — Deriv.: S. *porhyatu* m. 'labourer' (CDIAL 8422).

párśu— 1 m. 'rib' AV., *parśukā*— f. Suśr. 2. **pārśukā-** f. lex. 1. Gy. wel. *påš*, *påšavo* m. 'rib', Ash. *pa�ū́* (*pa�u—a�í*, *pa�u—wātr*, *pa�uwā́k*), Wg. *pa�ū̃́*, Kt. *pa�—čū�*; Pr. *pašī* 'breast'; Paš.lau�. ar. *pa�ū́*, ku�. chil. *pā�ū* 'rib', Shum. *pă�u—m* 'my rib', Gaw. *po�ū́*, Kal.rumb. *paš*, Kho. *praš* (← Phal. or similar dial. Morgenstierne FestskrBroch 150), Sv. *pra�ū́*, Bshk. *pa�ū́*, Phal. *prāšũ* f., Sh.gil. *prāši* f., jij. *páči;* S. *pasũ* m. 'rib of a boat'; H. *pā̃sū* f. 'rib'; — G. *pā̃sũ* n. bec. of gender rather < pārśvá—. — Ext. —*la*—: Pk. *paṁsuliā*— f. 'rib', L. *paslī* f., khet. *paslā̃* pl., P. *passalī*, *paslī* f., Aw.lakh. *pasurī*, H. *pasulī*, *paslī*, vill. *pāsurī* f., G. *pā̃s�ī* f., °*�ũ* n. (gender after *pāsũ*?), M. *pāso�ī*, *pā̃s*° f.; — N. *pā̃sulo* 'shin—bone'? 2. Pa. *pāsuka*—, *pāsu�a*— m. 'rib'. — With unexpl. *ph*—: Pa. *phāsukā*—, °*su�ā*—, °*su�ī*—, °*sulikā*— f. 'rib' (whence *upphāsulika*— 'having the ribs showing'), G. *phās�ī*, *phāso�ī* f. pārśvá—; *parśupā�aka—. Addenda: **párśu—1:** WPah.k�g. *śáp��* m. 'rib (of **human** body)' metath. of **paśu* + —*�a*—. (CDIAL 7948).
Tree as a hieroglyph
-- Tree in mlecchita vikalpa (writing system of smiths)
Mirror: http://tinyurl.com/397kc7

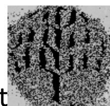
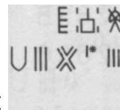
Rebus: kut.i 'smelter furnace' (Santali)

Vikalpa: kut.i, kut.hi, kut.a, kut.ha a tree (Kaus'.); kud.a tree (Pkt.); kur.a_ tree; kar.ek tree, oak (Pas;.)(CDIAL 3228). kut.ha, kut.a (Ka.), kudal (Go.) kudar. (Go.) kut.ha_ra, kut.ha, kut.aka = a tree (Skt.lex.) kut., kurun: = stump of a tree (Bond.a); khut. = id. (Or.) kut.amu = a tree (Te.lex.)

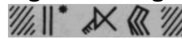
The sacredness associated with the Sarasvati hieroglyphs is exemplified by the word **kole.l** in Kota which means: 'smithy, temple in Kota village'. When smithy is a temple, all devices associated with the smithy assume auspiciousness, become glyphs denoting wealth, hence, hieroglyphs. The 'tree' glyph is one such hieroglyph of ancient times in Sarasvati civilization.

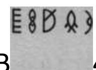
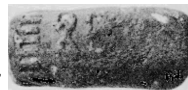

'Tree' Field Symbol 44 (Tree) 28 out of 34 occur at Harappa
 h352C Field Symbol 83 (Dotted circles) 57 out of 67 occur at Harappa

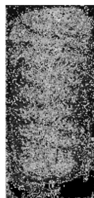
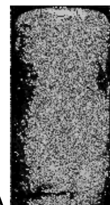
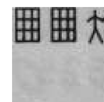

Slide 205 Faience tablet or standard. This unique mold-made faience tablet or standard (H2000-4483/2342-01) was found in the eroded levels west of the tablet workshop in Trench 54. On one side is a short inscription under a rectangular box filled with 24 dots. The reverse has a narrative scene with two bulls fighting under a thorny tree.

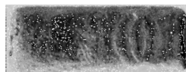
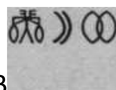
m0500atm0500bt2604 Pict-76: Tree, generally within a railing or on a platform.

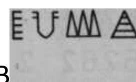
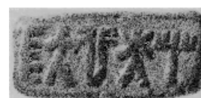
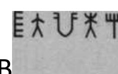


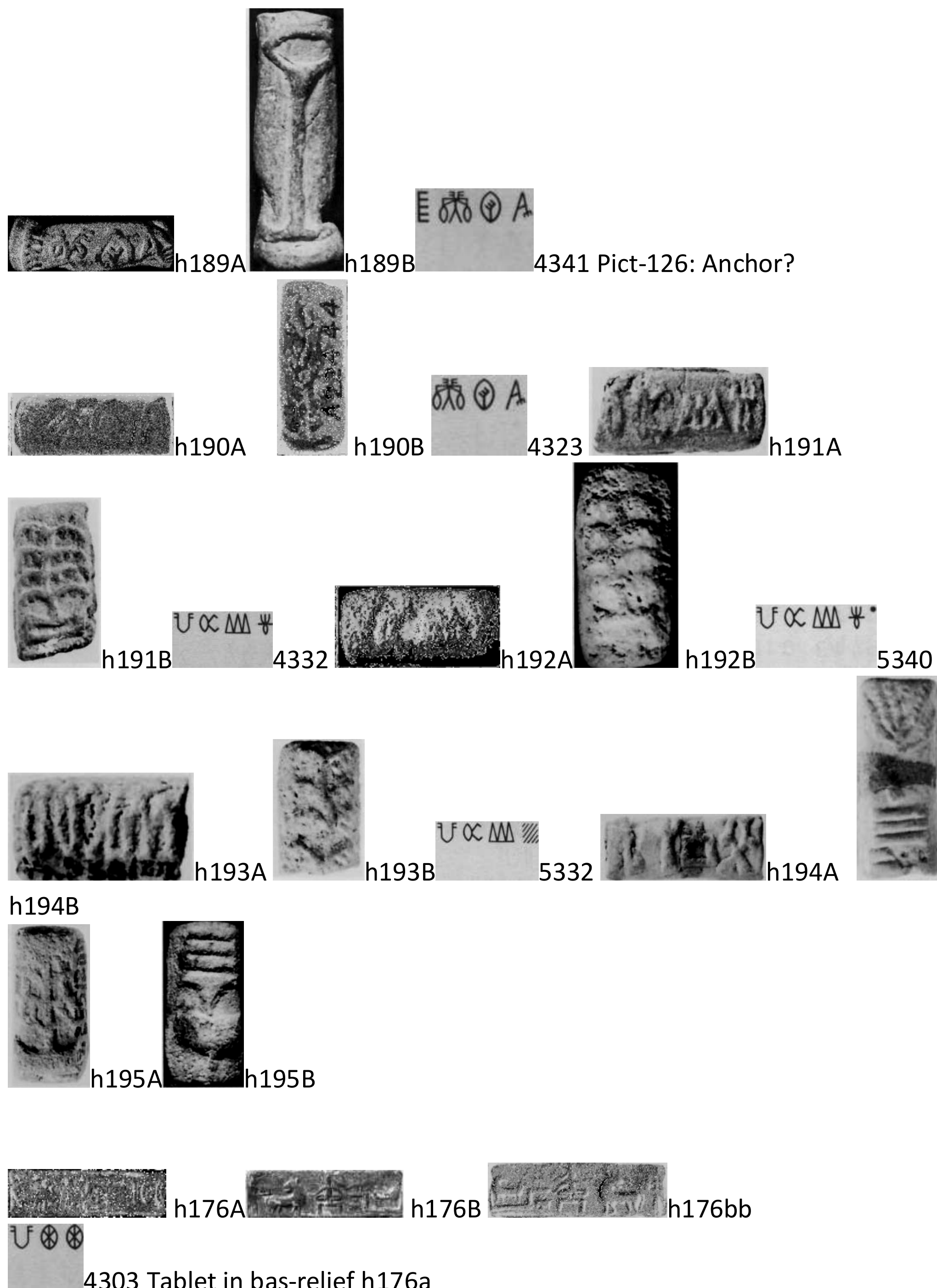
Pict-103 Horned (female with breasts hanging down?) person with a tail and bovine legs standing near a tree fisting a horned tiger rearing on its hindlegs. 1357

h183Ah183B4327h184A

h184Bh185Ah185B 5279

h186Ah186B4329

 h187A h187B5282 Pict-75: Tree, generally within a railing or on a platform. h188Ah188B4325

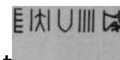


4303 Tablet in bas-relief h176a
Person standing at the centrebetween a two-tiered structure at R., and a short-horned bull (bison) standing near a trident-headed post at L. h176b
From R.—a tiger (?); a seated, pig-tailed person on a platform; flanked on either side by a person seated on a tree with a tiger, below, looking back. A hare (or goat?) is seen near the platform.

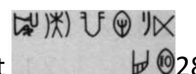
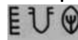
Pict-108  Person kneeling under a tree facing a tiger. [*Chanhudaro Excavations*, Pl. LI, 18]  6118
m0309 Pict-109: Person with hair-bun seated on a tree branch; a tiger looks at the person with its head turned backwards.  2522 m0310AC
 1355

 m0311 Pict-52: Composite motif: body of a tiger, a human body with bangles on arms, antelope horns, tree-branch and long pigtail. 2347

 m0478At  m0478Bt

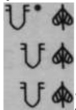
 m0479At  m0479Bt  3224
 m0480At  m0480Bt Tablet in bas-relief. Side a: Tree Side b: Pict-111: From R.: A woman with outstretched arms
flanked by two men holding uprooted trees in their hands; a person seated on a tree with a tiger below with its head turned backwards; a tall jar with a lid.

Is the pictorial of a tall jar the Sign 342 with a lid? Sign45 seems to be a kneeling adorant offering a pot (Sign 328) 2815 Pict-77: Tree, generally within a railing or on a platform. 3230

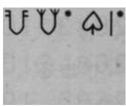
 m0481At  m0481Bt  m0481Ct
 m0481Et  2846 Pict-41: Serpent, partly reclining on a low platform under a tree m0482At m0482Bt

1620 Pict-65: Gharial, sometimes with a fish held in its jaw and/or surrounded by a school of fish.

m1186A 2430 Composition: horned person with a pigtail standing between the branches of a pipal tree; a low pedestal with offerings (? or human head?); a horned person kneeling in adoration; a ram with short tail and curling horns; a row of seven robed figures, with twigs on their pigtails. (ku_ti_ 'bunch of twigs')

 m1430Bt


m1430C m1430At Pict-101: Person throwing a spear at a buffalo and placing one foot on its head; three persons standing near a tree at the centre.
2819 Pict-60: Composite animal with the body of an ox and three heads [one each of one-horned bull (looking forward), antelope (looking backward) and bison (looking downwards)] at right; a goat standing on its hindlegs and browsing from a tree at the center.

m1431A m1431B m1431C

m1431E 2805 Row of animals in file (a one-horned bull, an elephant and a rhinoceros from right); a gharial with a fish held in its jaw above the animals; a bird (?) at right. Pict-116: From R.—a person holding a vessel; a woman with a platter (?); a kneeling person with a staff in his hands facing the woman; a goat with its forelegs on a platform under a tree. [Or, two antelopes flanking a tree on a platform, with one antelope looking backwards?]



A cylinder seal impression

"Impression of an Indus-style cylinder seal of unknown Near Eastern origin in the Musee du Louvre, Paris. One of the two anthropomorphic figures carved on this seal wears the horns of water buffalo while sitting on a throne with hoofed legs, surrounded by snakes, fishes and water buffaloes. Copyrighted photo by M. Chuzeville for the Departement des antiquites orientales, Musee du Louvre." (Parpola, 2001Parpola, A. (1998). Asko Parpola;. Retrieved June 15, 2001: http://www.harappa.com/script/parpola0.html) The glyptic elements of this cylinder seal are: tree, heads of horned bulls ligatured to snakes, contending bulls face-to-face, rhinoceros, ram, eagle, fishes, circle, hoofed-stool, standing person with horns

and plant adorning his head, a person holding back two rearing tigers with either hand outstretched with another tree nearby.

 m1370a 2509 Cylinder seal; tree branch



Tree in front. Fish in front of and above a one-horned bull. Cylinder seal impression (IM 8028), Ur, Mesopotamia. White shell. 1.7 cm. High, dia. 0.9 cm. [Cf. Mitchell 1986 Indus and Gulf type seals from Ur: 280-1, no.8 and fig. 112; Shaikha Haya Ali Al Khalifa and Michael Rice, 1986, *Bahrain*





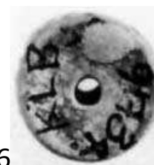
MS 4602 Indus Valley cylinder seal, ca. 3000 BCE depicting a palm tree and a man between two lions with wings and snakeheads, holding one arm around each, two long fish below, and one fish jumping after one lion's tail or the tail of a sitting monkey above it.

Seal matrix on creamy stone or shell, Indus Valley, Pakistan, ca. 3000 BC, 1 cylinder seal, diam. 2,0x3,7 cm, in fine execution influenced by the Jemdet Nasr style of Sumer.

Provenance: 1. Found in Mehrgarh, Pakistan; 2. The Waria Collection, Dadu, Pakistan (-2001).

Commentary: Similar fish can be found on Indus Valley pottery from the period and later

http://www.nb.no/baser/schoyen/5/5.6/index.html#4602

Kalibangan065aKalibangan065A6

Kalibangan065E 8024 Pict-104: Composition: A tree; a person with a composite body of a human (female?) in the upper half and body of a tiger in the lower half, having horns, and a trident-like head-dress, facing a group of three persons consisting of a woman (?) in the middle flanked by two men on either side throwing a spear at each other (fencing?) over her head.



m0296 Two heads of one-horned bulls with neck-rings, joined end to end (to a standard device with two rings coming out of the top

part?), under a stylized pipal tree with nine leaves. 1387

Harappa. Planoconvex molded tablet found on Mound ET. A. Reverse. a female deity battling two tigers and standing above an elephant and below a six-spoked wheel; b. Obverse. A person spearing with a barbed spear a buffalo in front of a seated horned deity wearing bangles and with a plumed headdress. The person presses his foot down the buffalo's head. An alligator with a narrow snout is on the top register. "We have found two other broken tablets at Harappa that appear to have been made from the same mold that was used to create the scene of a deity battling two tigers and standing above an elephant. One was found in a room located on the southern slope of Mount ET in 1996 and another example comes from excavations on Mound F in the 1930s. However, the flat obverse of both of these broken tablets does not show the spearing of a buffalo, rather it depicts the more well-known scene showing a tiger looking back over its shoulder at a person sitting on the branch of a tree. Several other flat or twisted rectangular terracotta tablets found at Harappa combine these two narrative scenes of a figure strangling two tigers on one side of a tablet, and the tiger looking back over its shoulder at a figure in a tree on the other side." [JM Kenoyer, 1998, p. 115].

Inscribed objects from Harappa 2000-2001 (Jonathan Mark Kenoyer and Richard H. Meadow)

Slide 185 Molded terracotta tablet (H2001-5075/2922-01) with a narrative scene of a man in a tree with a tiger looking back over its shoulder. The tablet, found in the Trench 54 area on the west side of Mound E, is broken, but was made with the same mold as ones found on the eastern side of Mound E and also in other parts of the site (see slide 89 for the right hand portion of the same scene). The reverse of the same molded terra cotta tablet shows a deity grappling with two tigers and standing above an elephant (see slide 90 for a clearer example from the same mold). Slide 90



[Pl. 39, Tree symbol (often on a platform) on punch-marked coins; a symbol recurring on many tablets showing Sarasvati hieroglyphs].

Sohgaura copper-plate (pre-Mauryan)

Rebus erka = ekke (Tbh. of arka) aka (Tbh. of arka) copper (metal); crystal (Ka.lex.) cf. eruvai = copper (Ta.lex.) eraka, er-aka = any metal infusion (Ka.Tu.) eruvai 'copper' (Ta.); ere dark red (Ka.)(DEDR 446). Ka. e�e to pour any liquids, cast (as metal); n. pouring; e�acu, ercu to scoop, sprinkle, scatter, strew, sow; e�aka, **eraka** any metal

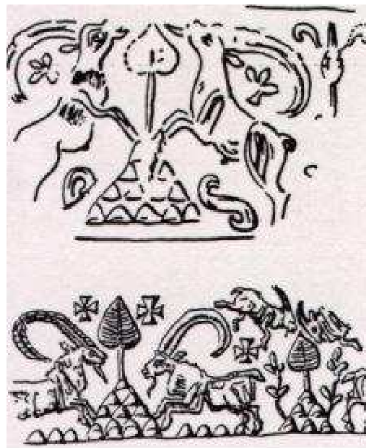
infusion; molten state, fusion. Tu. **eraka** molten, cast (as metal); eraguni to melt. (DEDR 866).

Vikalpa: **erga = act of clearing jungle (Kui)**



Vikalpa: Spy on a tree, seated like a kaulo 'smith'. Tree is kut.i rebus for vikalpa kut.hi 'smelter furnace'. What is it a furnace for? Rebus: eraka = metal infusion (Ka.); Vikalpa: Spy = heraka Ko. er uk- (uky-) to play 'peeping tom'. Kui ēra (ēri-) to spy, scout; n. spying, scouting; pl action ērka (ērki-). ? Kuwi (S.) hēnai to scout; hēri kiyali to see; (Su. P.) hēn�- (hē�-) id. Kur. ērnā (īryas) to see, look, look at, look after, look for, wait for, exam- ine, try; ērta'ānā to let see, show; ērānakhrnā to look at one another. Malt. ére to see, behold, observe; érye to peep, spy. Cf. 892 Kur. ēthrnā. / Cf. Skt. h**eraka**- spy, Pkt. her- to look at or for (DEDR 903) *hērati 'looks for or at'. 2. hēraka—, °rika— m. 'spy' lex., hairika— m. 'spy' Hcar., 'thief' lex. [J. Bloch FestschrWackernagel 149 ← Drav., Kui ēra 'to spy', Malt. ére 'to see', DED 765] 1. Pk. hēraï 'looks for or at' (vihīraï 'watches for'); K.�o�. hērūō 'was seen'; WPah.bhad. bhal. h e_ rnū 'to look at' (bhal. hirā�ū 'to show'), pā�. hēra�, pa�. hē�ā, cur. hērnā, Ku. her�o, N. hernu, A. heriba, B. herā, Or. heribā (caus. herāibā), Mth. herab, OAw. heraï, H. hernā; G. hervũ 'to spy', M. her�ẽ. 2. Pk. hēria— m. 'spy'; Kal. (Leitner) "hériu" 'spy'; G. her� m. 'spy', herũ n. 'spying'. (CDIAL 14165).







The location of Sembiyan-kandiyur is not far from Swamimalai where the shrine of Subrahmanya (one of the arupat.aiveet.u, that is, one of the six camps of the commander) is called eraka-subrahmanya. Eraka ! Copper, metal infusion. At Swamimalai, the artisans make bronze murti-s in the vis'vakarma tradition – using cire perdue technique (lost wax process) which was used by the artisans of Sarasvati civilization. (See annex on lost-wax method used in southeast asia bronzes).

er-agu 'a bow, an obeisance' (Ka.)

Mountain topped by a leaf gets stylized as an important motif. Pro-elamite glyptics. Leaf motif. 1-c, After Legrain,L., 1921, Empreintes de cachets elamites, *Mem. Mission Arch. De Perse* 16, Paris: 62-654; d. After Amiet, P., 1961, *La glyptique mesopotamienne archaique*, Paris: 497; Mundigak IV.3; 3. After Casal, J.M., 1961, Fouilles de Mundigak I-II. *Mem. Delegation Arch. Franaise en Afthanistan* 17, Paris: fig. 102: 485; f. Early Harappan. Kalibangan. After Sankalia, 1974: 346, fig. 88d, A. H-L; cf. Fig. 23.45 Asko Parpola, 1996, fig. 23.45. Two goats eating from a tree on a

mountain top in proto-Elamite seals from Susa [After Amiet, P., 1972, Glyptique susienne I-II, *Mem. Delegation Arch. En Iran* 43, Paris: 978 and Legrain, L., 1921, Emprientes de cachets elamites, *Mem. Mission Arch. De Perse* 16, Paris: 316].



Tree and lion on lower register, superimposed by proto-elamite inscription. Tree motifs are repeated in the epigraph. Administrative tablet with seal impression in proto-cuneiform, Mesopotamia, circa 3000–2900 B.C.

Chlorite vessel found at Khafajeh: Ht 11.5 cm. 2,600 BCE, Khafajeh, north-east of Baghdad (Photo from pg. 69 of D. Collon's 1995 *Ancient Near Eastern Art*). The vessel was made somewhere east of Baghdad, possibly in Iran, and transported to Khafajeh where it was found. At the left of the panel, a man wearing a net skirt is kneeling on a pair of Zebus who are standing back to back. He is holding streams of water showering down onto vegetables and a palm tree. The wavy line above his head may be rain clouds, they share the sky with a crescent moon and a rosette sun. The second figure is also depicted with a rosette at his shoulder. He has a snake in each hand and is standing between two felines, both turned in his direction. At the right of the panel, a bull is being attacked by a large bird (eagle) and a lion while another small animal faces the other way. This image was created by rotating the straight sided vessel for the exposure of the photograph.

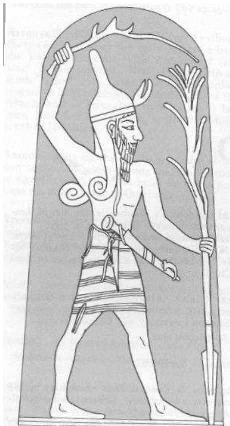


Cylinder seal: Ht. 3.6 cm. 2,220 - 2,159 BCE, Mesopotamia (Photo from pg. 216 of J. Aruz and R. Wallenfels (eds.) 2003 *Art of the First Cities*).

This Akkadian example of a seal impression shows a hero wrestling with a water buffalo (left) and a bull-man struggling with a lion (right). The figures are separated by a tree on a mountain. The hero faces the viewer and dominates the scene. Akkadian seals tend to be arranged into clusters of figures that display physical tension in scenes of active combat.



Detail from "Great Lyre" from Ur: Ht 33 cm. 2550 - 2400 BCE, royal tomb at Ur (Photo from pg. 106 of J. Aruz and R. Wallenfels (eds.) 2003 *Art of the First Cities*). The front panel of the sound box from the so-called Great Lyre was recovered among grave goods in the royal tomb at Ur. The panel is made of shell and bitumen and is divided into four registers. The top panel is of a male embracing two human headed bulls, the three lower panels show scenes from a funerary banquet in which animals play the roles normally assumed by humans.



Baal, the storm god, is represented holding a club in his left hand. The lance extends upward in the form of a tree, or stylized lightning. Found at Ras Shamra in 1932.

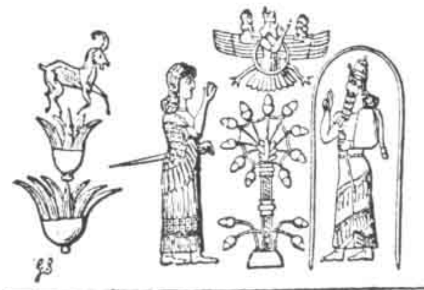


Baal. Name of the most prominent Canaanite deity. As the god of fertility in the Canaanite pantheon (roster of gods), Baal's sphere of influence included agriculture, animal husbandry, and human sexuality... Baal worship became prominent in the northern kingdom of Israel during the days of King Ahab when he married Jezebel of Tyre. It later *infiltrated the Kingdom of Judah. See also: http://phoenicia.org/pagan.html

http://www.edwardtbabinski.us/history/tree_of_life.html

Mesopotamian limestone cylinder seal and impression—worship of Shamash, (Louvre). Cult scene: the worship of the sun-god, Shamash. Limestone cylinder-seal, Mesopotamia. AO 9132 Department of Oriental Antiquities, Richelieu, ground floor, room 6, case 4





The owner of this seal can be identified from the cuneiform inscription which translates: 'Seal of Mushezib-Ninurta, governor, son of Ninurta-eresh, ditto, son of Samanuha-shar-ilani, ditto.' Samanuha-shar-ilani was ruler of Shadikanni (Arban in eastern Syria), in 883 BC, and an Assyrian vassal - subject to the firm control of Assyria, and enjoying the wealth and security that such political domination provided.

During this period, seal designs were often cut on hard stones using cutting-wheels and drills. The image is similar to two wall reliefs from the throne room of King Ashurnasirpal II (reigned 883-859 BC) at Nimrud. The king, shown in mirror image, is protected by guardian genii sprinkling holy water from a bucket using what may be a fir cone or sponge. A stylized tree stands in the centre, symbolizing nature and the land of Assyria. Above is a god in the winged disc. Length: 4.9 cm Diameter: 1.7 cm Found by H.C. Rawlinson and acquired by The British Museum around 1852 D. Collon, First impressions: cylinder seals in the Ancient Near East (London, The British Museum Press, 1987), pp. 76-7, fig. 341 A.H. Layard, Discoveries in the ruins of Nineveh and Babylon (London, J. Murray, 1853), p. 603
http://www.greatdreams.com/reptlan/pindar.htm

http://www.sacred-texts.com/evil/hod/img/04000.jpg

Amots Dafni **(**Institute of Evolution, Haifa University, Haifa 31905, Israel), 2006, On the typology and the worship status of sacred trees with a special reference to the Middle East, J Ethnobiol Ethnomedicine. 2006; 2: 26. May 15, 2006 This article contains the reasons for the establishment of sacred trees in Israel based on a field study. It includes 97 interviews with Muslim and Druze informants. While Muslims (Arabs and Bedouins) consider sacred trees especially as an abode of righteous figures' (Wellis') souls or as having a connection to their graves, the Druze relate sacred trees especially to the events or deeds in the lives of prophets and religious leaders. A literary review shows the existence of 24 known reasons for the establishment of sacred trees worldwide, 11 of which are known in Israel one of these is reported here for the first time. We found different trends in monotheistic and polytheistic religions concerning their current worship of sacred trees.





http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=1500805

Plaque from Royal tomb of Ur, ca. 2600 to 2500 BCE. Entwined in the branches of a flowering tree, two goats appear to be nibbling on its leaves. This decorative plaque which was carved from shell and highlighted with bitumen was also excavated from the Royal Tombs.
Impression from a marble cylinder seal from fourth-millenium B.C. Uruk in southern Mesopotamia, showing a ruler feeding two sheep from a sacred tree.



Fragment of a bronze helmet from Argishti I's era. The "tree of life", popular among the ancient societies, is depicted. The helmet was discovered during the excavations of the fortress Of Teyshebaini on Karmir-Blur (Red Hill).

http://en.wikipedia.org/wiki/Urartu See: A. Sayce, The Kingdom of Van (Urartu), Cambridge Ancient History, vol. II, p. 172 See also C. F. Lehman-Haupt, Armenien Einst und Jetzt, Berlin, 1931, vol. II, p. 497

This persistent portrayal of the tree of life with its guarding celestial beings pervaded the Urartian culture. For generations, personal seals imprinted the sacred tree on correspondence carried throughout the empire (25). Rulers and administrators sipped wine from bronze cups stamped with the emblem of the tree (26). Urartian warriors carried the symbol of the sacred tree to battle on bronze belts (27) and pointed helmets (28). Carved stones displayed the sacred tree throughout the land (29). Colorful wall paintings (30) and carved columns (31) in palaces and other buildings repeated the recurring theme. **25. Piotrovskii, pp 72, 74;** See: Boris B. Piotrovsky, *The Ancient Civilization of Urartu*, Cowles Book Co., Inc., New York, NY, 1969
25. Piotrovsky, pp 127,157
26. Piotrovsky, pp 153
27. Piotrovskii, pp 48, 49, 50; Piotrovsky, pp 177
28. Piotrovskii, pp 46; Piotrovsky, pp 160
29. Piotrovskii, pp 66, 69, 64
30. Piotrovskii, pp 78-79; Piotrovsky, pp 70; Lloyd, pp 120
31. Piotrovsky, pp 132

Ancient kingdom of Urartu (Biblical Mount Ararat) around Lake Van, southwestern Asia. Today the region is divided among Armenia, eastern Turkey, and northwestern Iran. The kingdom flourished *c.* 13th – 7th century BC, enjoying considerable power in the Middle East in the 9th – 8th century. Archaeological finds date from the time of King Shalmaneser I (*c.* 1274 – 45) of Assyria.
The kingdom's native name was *Biainili*. Scholars believe that "Urartu" is an Akkadian variation of **Ararat** of the Old Testament. The variations possibly originate from the Armenian "Ayrarat," which in Armenian means "land of the brave" and "land of Armenians." Armenian Soviet Encyclopedia, v. 12, Yerevan 1987, p. 280



SACRED TREE WITH ATTENDANTS ON LID FROM STEATITE JAR. (Urartian, 8th Century B.C. Armenian Historical Museum, Erevan).



http://www.starspring.com/ascender/urartu/urartu.html
Relief: Sacred Tree Attended by Winged Beings; Neo-Assyrian period, reign of Ashurnasirpal II (r. 883–859 B.C.) Mesopotamia; excavated at Nimrud (ancient Kalhu) Alabaster (gypsum) The plant represented on both registers of this relief is the so-called sacred tree. Its trunk rests on a flat base and is topped by a palmette, and it is encircled by smaller palmettes connected to the trunk by a network of branches. In the upper register, the sacred tree is attended by human-headed genies. In the lower register, bird-headed genies holding buckets and cones fertilize the tree in a manner similar to the manual fertilization required for date palm trees to bear fruit. The sacred tree was an extremely important symbol in the palace of Ashurnasirpal, appearing on reliefs in virtually every room of the palace. It was also used in textile patterns, on stamp and cylinder seals, and in ivory carvings. It represented both the king and Ashur, the chief god of Assyria, and was also a symbol of the fertility of the land. http://www.metmuseum.org/explore/anesite/html/el_ane_relief4.htm

The Assyrian Tree of Life of Ashur depicts a column with seven branches along each of its sides, crowned with a blossom or flower of spherical shape, from which three light beams emanate.



http://www.meditaid.com/Projects/TheTreeofLife/tabid/56/Default.aspx

Assyrian Ashurnsirpal Relief

Assyrian Ashurnsirpal Relief from Nimrud, 865 B.C., can now be found at the British Museum. This section of wall relief was behind the king's throne and depicts a ritual involving a tree. Another panel with the same scene was opposite the center doorway of the throne room. The king is shown twice, on either side of a symbolic tree. On the left and on the right is an apkallu. This relief is made from compound stone with an antique sandstone finish. It measures 24”W x 13”H.

Normally, floating above the Assyrian tree of life was the god Assur—this corresponds to Ein Sof, which is also, via a series of transformations, supposedly derived from the Assyrian word Assur. http://www.answers.com/topic/simo-parpola Simo Parpola, 1993, The Assyrian tree of life, JNES 32 (1993), pp. 161-298l

Giovino, Mariana, 2007, The Assyrian sacred tree, a history of interepretations, Orbis biblicus et orientalis 230, Academic Press, Fribourg, Coedition with Vandenhoeck & Ruprecht, Göttingen

The Assyrian Sacred Tree A History of Interpretations

The so-called Assyrian sacred tree is the most discussed motif in the historiography of Assyrian art. It is familiar from the reliefs in the throneroom of A__urnasirpal II at Nimrud, but it has a family of close relatives that appear in a variety of other media. To date, no contemporary text has been found that mentions this ‘tree,’ and, as a result, scholars have not yet arrived at a consensus on its iconography. Nevertheless great efforts have been made to decipher the symbol, ever since A. H. Layard recovered the Nimrud reliefs in the mid-nineteenth century. This book traces the intricate history of the iconographic debate, from 1849 to the present. Scholars have tended towards three principal interpretations of the sacred tree: that it represents the ‘tree of life’ known from Genesis, or a stylized date palm, or a constructed cult object. The ‘tree of life’ theory has had few takers since the late nineteenth century (although it has recently enjoyed a small revival); the date palm interpretation, on the other hand, has dominated the discussion since 1890, when E. B. Tylor proposed that winged figures standing on either side of the ‘tree’ were fertilizing it. This analysis has had a number of serious objections levelled against it from the beginning, but it managed to thrive, primarily because it built up a critical scholarly mass early on in the debate. The third of the main interpretations, the cult object theory, also fell victim to the date palm theory in the middle of the last century, and the details of its argument have been largely forgotten by recent contributors to the debate. In the author’s view it is the most promising of the three, and she builds upon the arguments of earlier cult object theorists using archaeological and textual material. This book, then, is a critical historiography, which both surveys the vast literature on this topic and intervenes in the debate. It will be found invaluable by anyone who wishes to study this enigmatic motif, and it will also be of interest to historians of Assyrian art and religious cult. And, as an analysis of the ways in which a scholarly debate can fall victim to an implausible consensus, it will provide a useful test case for students in the growing field of historiography.

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department at the University of Michigan, Ann Arbor, and previously completed an M.A. in History of Art and one in Assyriology at the same institution.

B.N. PORTER**,** *Trees, Kings, and Politics*, Fribourg (Academic Press) - Göttingen (Vandenhoeck & Ruprecht) 2003 (= Orbis Biblicus et Orientalis 197),

Compilation of nine essays (two of which previously unpublished) by a leading Assyriologist focusing on the role of visual imagery in Assyrian propaganda and illustrated with 4 line-drawings and 33 plates. The Assyrian sacred tree is the central topic of the first four contributions: "Assyrian Bas-reliefs at Bowdoin College", pp. 1-10; "Sacred Trees and Date Palms", pp. 11-20; "The Meaning of the Assyrian Tree Image", pp. 21-30 and "Seasonal Time and Eternity in Ancient Assyria", pp. 31-38).

http://www.akkadica.org/libro_Trees-Kings.htm

Assyrian "Sacred Tree," a highly stylized Date-Palm (?) with a stylized border of vines (?) about it from the Assyrian palace at Nimroud (ancient Calah of the Bible). Perhaps this is a possible prototype behind Genesis' "Tree of Life" in the Garden of Eden? Palmtrees decorated the Temple of Solomon's walls in association with Cherubim (1 Kings 6:32). Eden's Tree of Life was guarded by Cherubim too. Date-Palms are an important food source in Oasis villages; perhaps this is why it became the "Tree of Life." ? (cf. p.44. Austen Henry Layard. *A Popular Account of the Discoveries at Nineveh.* London. John Murray. 1852)

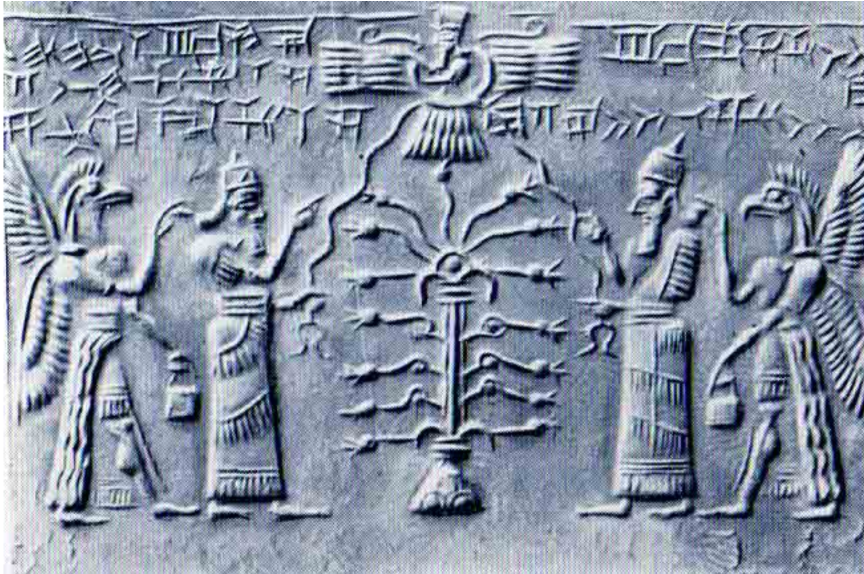
http://www.bibleorigins.net/Sacredtreeassyrian.html



SACRED TREE SHOWING DIVIDED PILLAR.
Layard, *Monuments of Neneveh.*

"It first appears on Chaldean cylinders as a pillar or "World Spine" surmounted by a crescent, frequently the pillar is thrice-crossed by branches which end in circles. About the beginning of the tenth century B.C. the tree becomes more complex. Conventionalised into elaborate and graceful forms, it was one of the most conspicuous objects found on the sculptures and monuments of Khorsabad and Nimroud."

http://altreligion.about.com/library/texts/bl_ancientpagan18.htm



Seal of the 9th century (?) from Shadikanni on the Habur.
http://www.specialtyinterests.net/eop8.html



Stele of Naarm-Sin, an early Semitic King of Agade in Babylonia, who reigned about B. C. 3750. From the photograph by Messrs. Mansell & Co.
http://www.gutenberg.org/files/17321/17321-h/v1b.htm



Bas-relief in stone showing Lagash's King Gudea (his face hacked away apparently by a non-admirer) being grasped by the hand by the god Ningishzida and led to a seated god (?) who dispenses life-giving freshwater needed for Lagash's crops. Ningishzida has serpent-dragon heads erupting from his shoulders. The god standing before Ningishzida is unidentified, but he "might be" Dumuzi, who, with Ningishzida in the *Adapa and the Southwind Myth* brought man (Adapa) before Anu to receive the "water of life" (for the photo cf. figure 189. Anton Moortgat. *Die Kunst des Alten Mesopotamien, Die klassische Kunst Vorderasiens*. Darmstadt. Wissenschaftliche Buchgesellschaft. 1967. Verlag M. DuMont Schauberg. Koln). Gudea holds a palm frond in his hand, perhaps from a date palm? Date palm plantations existed in antiquity in Mesopotamia and were an important food source. The Bible suggests for some scholars the "Tree of Life" planted in the Garden of Eden may have been a Date palm as Solomon's Temple is described as having Cherubim and Palmtrees

lining its walls (1 Kings 6:32) and God stations the Cherubim to deny man access to the "Tree of Life" in Eden's Garden (Genesis 3:24).

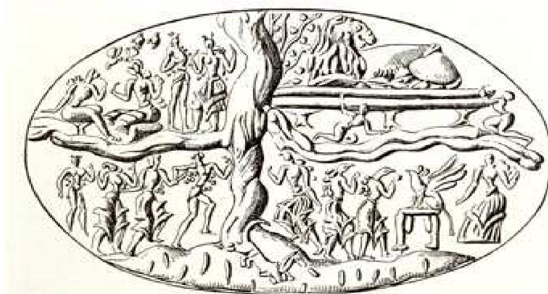
“Yet another proof that the term "Parsee" was used not only in the ethnic sense but in the religious sense in ancient Iran, i.e. before the Zoroastrians emigrated to India, is to be found in the Pahlavi texts, Karnaamak i Artakshir I Papakan (" A History of Ardeshir Papak", the founder of the Sassanian Empire- -226-242 A.D.) and Drakht-i-Asurik ("The **Assyrian** **Tree**"). In the former text, Artakshir has been categorically referred to as, Khvataye Parsikan = the King of the Parsees".”
http://tenets.zoroastrianism.com/acceptance_never_ever_Final_2006.pdf



Leaping Stag c.1300-1200 B.C. Middle Assyrian period. Milky chalcedony. Cylinder seal.

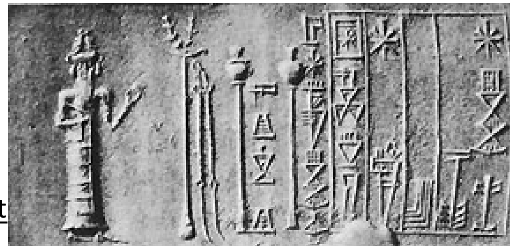


A stag leaps with upflung leg through a wooded, mountainous region, indicated by the twisted trees and scale pattern representing the mountain from which it grows. A small bird is perched on a thistle-like plant beneath the tree.



From Crete, engraved on a beautiful gold seal ring called the Ring of Nestor, found in a beehive tomb at Pylos on the west coast of the Peloponnese and dated to c. 1500 BC. It shows a young deceased couple seated on a branch of a great Tree. Above their heads are two small chrysalises and, hovering near these, two butterflies.

Cretan Seal from Pylos
http://www.annebaring.com/anbar16_reflections.htm



G-Sum 19: Early Dynastic Physician’s Cylinder Seal

A most interesting seal of a physician from the Early Dynastic III period. It shows the worshipper, in almost stick figure style, with his arms raised in prayer and a six column inscription. The inscription must be of a standard, formulatic type as it is 90% identical to one on a Old Babylonian physician's seal shown in Chiara's book *They Wrote On Clay* (impression shown below right). Both also show the distinctive "physician's instrument", although Chiara's example also has a sacred tree and two standards with pots, and the god wears a distinctive Babylonian costume. Richly mottled steatite in black, brown and red, 30 x 18 mm, c. 2600-2400 B.C.





G-Sum 22: Akkadian Cylinder Seal with Seated Goddess, Altar and Tree Myth

A short,black steatite seal with a very complex scene. A priest stands before a burning altar in front of a seated goddess with outstretched hands and a star of divinity above her. Behind the goddess a woman sits spinning under a large tree that is being bent or pulled down over her. There is a three character inscription separating the designs, and it is fitted into the design in a crude manner.





King Standing on Sphinxes and Holding a Lion in Each Hand; Palm Tree with Winged Sun-Disk Above

Cylinder seal and impression Persia, Achaemenid period (ca. 550–330 B.C.) Agate 32 x 15 mm Seal no. 824



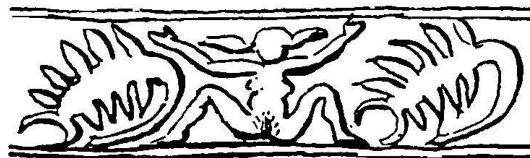
Stone of Esarhaddon. Memorial relief on black basalt. Ca. 676 B.C. 21.5 cm. British Museum, UK. Inscribed with an account of Esarhaddon's restoration of Babylon. At top, the sacred tree and a horned crown on an altar. Below a Bablylonian plough with seed drill.

http://www.hp.uab.edu/image_archive/ue/relief05.jpg
Altar of Tukulti-Ninurta I (1244-1208 B.C.), in Ashur. The god, Nusku, is represented here on the altar as a symbol rather than in anthropomorphic form, which is considered an important feature of emerging Assyrian culture.
http://www.hp.uab.edu/image_archive/ue/relief05.jpg
Asherah, the Tree of Life and the Menorah : Continuity of a Goddess symbol in Judaism? *The First Sophia Fellowship Feminist Theology Lecture .The College of St. Mark & St. John. Plymouth. 4th December 1996 by Asphodel P. Long* . Long argues that "there might be a connection, rooted in the Hebrew bible, between the female figure there named Asherah, the Garden of Eden, the Tree of Life and the Menorah (the seven branched candlestick of Jewish life and ritual)…" http://www.asphodel-long.com/html/asherah.html



http://phoenicia.org/pagan.html
"Asherah poles are mentioned in the Hebrew Bible in the books of Exodus, Deuteronomy, Judges, the Books of Kings, the second Book of Chronicles, and the books of Isaiah, Jeremiah, and Micah. The term often appears as merely אשרה, (*Asherah*) translated as "groves" in the King James Version and "poles" in the New Revised Standard Version; no word that may be translated as "poles" in the text. Scholars have indicated, however, that the plural use of the term (*Asherahs*, also *Asherim* or *Asherot*) provides ample evidence that reference is being made to objects of worship rather than a transcendent figure." van der Toorn, Becking, van der Horst (1999), *Dictionary of Deities and Demons in The Bible*, Second Extensively Revised Edition, pp. 99-105, William B. Eerdmans Publishing Company loc.cit. http://en.wikipedia.org/wiki/Asherah_pole

Vikalpa: kola =**woman** (Nahali) **kola** =tiger (Santali) ***Ta.*** **kulai (-pp-, -tt-)** to shoot forth in a bunch (as a plantain); ***n.*** cluster, bunch (as of fruits, flowers); ***Ko�.*** **kola- (kolap-, kolat-)** (plant) shoots against (one who planted it; in a proverb); **kole** bunch of plantains. (DEDR 1810) ***Go.*** (Tr.) **kō�sānā, kōrsānā** to **sprout**, grow (of trees, plants, etc.) (DEDR 2149). **mukulayati** '*blossoms' (Skt.) (CDIAL 10147)
Rebus: kol =alloy of five metals (Tamil)



A symbolism of a woman spreading her legs apart, which recurs on an SSVC inscribed object.
Cylinder-seal impression from Ur showing a squatting female. L. Legrain, 1936, Ur excavations, Vol. 3, Archaic Seal Impressions.





Rebus: kut.hi, kut.i (Or.; Sad. **kot.hi**) (1) the smelting furnace of the blacksmith; **kut.ire bica duljad.ko talkena**, they were feeding the furnace with ore; (2) the name of e_kut.i has been given to the fire which, in shellac factories, warms the water bath for softening the lac so that it

can be spread into sheets; to make a smelting furnace; kut.hi-o of a smelting furnace, to be made; the smelting furnace of the blacksmith is made of mud, cone-shaped, 2' 6" dia. At the base and 1' 6" at the top. The hole in the centre, into which the mixture of charcoal and iron ore is poured, is about 6" to 7" in dia. At the base it has two holes, a smaller one into which the nozzle of the bellow is inserted, as seen in fig. 1, and a larger one on the opposite side through which the molten iron flows out into a cavity (Mundari.lex.)

Vikalpa: kut.hi = pubes. kola 'foetus' [Glyph of a foetus emerging from pudendum muliebre on a Harappa tablet.] kut.hi = the pubes (lower down than pan.d.e) (Santali.lex.) kut.hi = the womb, the female sexual organ; sorrege kut.hi menaktaea, tale tale gidrakoa lit. her womb is near, she gets children continually (H. kot.hi_, the womb) (Santali.lex.Bodding) ko_s.t.ha = anyone of the large viscera (MBh.); kot.t.ha = stomach (Pali.Pkt.); kut.t.ha (Pkt.); kot.hi_ heart, breast (L.); kot.t.ha_, kot.ha_ belly (P.); kot.ho (G.); kot.ha_ (M.)(CDIAL 3545). kottha pertaining to the belly (Pkt.); kotha_ corpulent (Or.)(CDIAL 3510). Kot.ho [Skt. kos.t.ha inner part] the stomach, the belly (G.lex.) ku_ti = pudendum muliebre (Ta.); posteriors, membrum muliebre (Ma.); ku.0y anus, region of buttocks in general (To.); ku_di = anus, posteriors, membrum muliebre (Tu.)(DEDR 188). ku_t.u = hip (Tu.); kut.a = thigh (Pe.); kut.e id. (Mand.); ku_t.i hip (Kui)(DEDR 1885). gu_de prolapsus of the anus (Ka.Tu.); gu_da, gudda id. (Te.)(DEDR 1891).

This sculpture showing a scorpion on the hip of a woman sculpted on Khajuraho temple friezes is explained as a pun on the word kharjura 'scorpion'. Another explanation could be the lexeme, kut.a 'thigh' could be linked to kut.i 'smelting furnace for bica 'stone ore'); rebus: bica 'scorpion'.
On the lid of an ivory pixus from Minet el-Beida , Ugarit sea-port. She holds a bunch of plants on each hand. Carved in ivory. Cretan style skirt. Jackals (?) on either side. Asherah. In the Old Testament she is identified with her sacred groves. See also: http://www.amazon.com/Religions-Ancient-World-University-Reference/dp/0674015177 Sarah Iles Johnston **Religions of the Ancient World: A Guide (Harvard University Press Reference Library)**
baria~u, bhal, bhale great (Santali.lex.) See abaru = be strong, powerful (Akkadian/Assyrian).
Some of the glyphs on tannach cult stand have parallels in Indus script -- Sarasvati glyphs. For example, the two goats standing up and flanking a tree, see epigrpah on tablet, m1393, m1430C Parpola (tree becomes sacred in ancient Assyrian tradition and also in the Indic tradition). Lion is a recurrent motif on Assyrian glyphs, tiger is a recurrent motif on Sarasvati glyphs.

Since Sarasvati glyphs are hieroglyphs, there is a possibility that the Assyrian glyphs are also hieroglyphs, read rebus.

eru_, aru = eagle (Akkadian/Assyrian)

aru_ = lion (Mergal as divinity of devastation is called A-ri-a)(Akkadian)

abru = wing (Akkadian/Assyrian)

What could the rebus homonys be?

aba_ru = lead, antimony (cf. CAD A (II): 126; AHw 49)

abaru = be strong, powerful; strength, power (Akkadian/Assyrian)

[Thus, when wings are ligatured to royalty, it may be rebus abaru, 'powerful, strong'.]

aru = copper; eru_ = copper?, bronze (eru_, 'engrave, carve'); urudu = bronze (Akkadian); hurru (CAD) = mined copper (Akkadian)

urru, u_ru = heap, mountain (Akkadian/Assyrian) [Some glyphs show goats flanking a mountain with a leaf on the summit.]

In one of the pictures, a plough or seeding drill is also shown, together with a mountain (BM91027 "Pictographs" on Esarhaddon foundation stone ("Black Stone"):

There are some homonymous parallels (perhaps, cognates) in Indic languages.

he_rka pl. plough (Kuwi)(DEDR 2816). si(h)a_ra_ drill for sowing seed (L); sia_ra = furrow (Or.)(CDIAL 13429)

eraka, era = syn. erka, 'copper, weapons' (Ka.); erako_lu = iron axle of a carriage (Ka.M.)

erako = molten cast (Tu.); eh-ku =steel (Ta.)
eruvai = a kind of kite whose head is white and whosse body is brown;
eagle (Ta.); eruva = eagle, kite (Ma.)(DEDR 819)

er-aka = upper arm, wing (Te.)

It appears that many of the Akkadian glyphs are also hieroglyphs. At the following URL, a picture is included shwoing a winged-tiger ligatured to the head of an eagle/kite on a Nal pot.
http://pages.google.com/edit/kalyan97/bronzeagetradeandmlecchawriting

In this instance, the wing becomes a phonetic determinant for the 'eagle': eruva.

Vikalpa: kut.i = tree; rebus: kut.hi 'furnace, smelter' (Santali)

loa = a species of fig tree, ficus glomerata (Santali) [Hence, the depiction of a fig-leaf (pipal) on the summit on some glyphs.] Rebus: lo(h) = metal (H. and many languages of Indic language family)A phonetic determinant is lo = nine (Santali); and hence,

nine leaves are shown on some epigraphs (m296 Parpola).

Tiger is a hieroglyph. kola 'tiger' (Munda); rebus: kol 'pancaloha, alloy of five metals' (used normally for making bronze statues)(Ta.). Koles are smelters. kollan 'smith' (Ta.) Thus, ligatured to an egle,
the hieroglyph connotes: 'molten cast metals (alloys)' -- kol erako. An epigraph connoting the product of a smithy/mint.

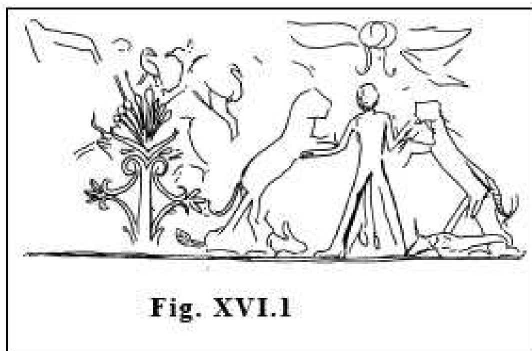
PS:Mountain topped by a leaf gets stylized as an important motif. Proto-elamite glyptics. Leaf motif. 1-c,After cachets elamites, Mem.

Legrain,L., 1921, Empreintes de Mission Arch. De Perse 16, Paris: 62-654; d. After Amiet, P., 1961, La glyptique mesopotamienne archaique, Paris: 497; Mundigak IV.3; 3. After Casal, J.M., 1961,

Fouilles de Mundigak I-II. Mem. Delegation Arch. Franaise en Afthanistan 17, Paris:fig. 102: 485; f. Early Harappan. Kalibangan. After Sankalia, 1974: 346, fig. 88d, A. Leaf on a mountain motif becomes a seal from Kalibangan. k53 (Parpola)
http://www.hindunet.org/saraswati/munda/furnace1.pdf

H-L; cf. Fig. 23.45 Asko Parpola, 1996, fig. 23.45.
The most remarkable part of the following analysis by Kantor relates to the design of the 'Assyrian tree' as a hybrid design of a pole ornamented with copper bands.

This use of copper bands as decorative elements, provides the link to smithy and helps identity the 'hieroglyphic' sea peoples, the assur who are now found in the Ganga river valley. Is the name 'assur' of these people and the 'assur' of Assyria, a mere coincidence?


Fig. XVI.1

Helene J. Kantor explains the figure which contains the contest motif of Sarasvati hieroglyphs: a person holding back two rearing tigers.

[quote] As Riegl and others have pointed out, the creations of the ancient Orient provided the sources from which the plant ornaments of Greece developed. These, in turn, supplied the basis for the later development of vegetal decoration, in the East as well as in the West…Figure XVI.1 is composed in the same free field manner characteristic for the higher products of the Mitannian seal cutters, but no longer used in the developed Assyrian style of 13th century Mitanni seals. The composition consists of two main groups, one being a hero quelling two raging lions mounted on couchant bulls. We have not found detailed parallels for this group on Mitannian seals, but its core, the axial human figure between two diagonal beasts of prey, can be matched by groups on Mitannian and Second Syrian seals in which the hero is

kneeling. Above the man of Fig. XVI.1 is suspended the winged sun disc so common in Mitannian and Syrian glyptic hooks. Herzfeld has pointed out that these fine parallels in the cartouches of the Hittite kings. [unquote]
http://oi.uchicago.edu/OI/DEPT/RA/HJK/HJKI.pdf
http://oi.uchicago.edu/OI/DEPT/RA/HJK/HJKXVI.pdf

[quote] Between the Asia of the Second Millennium B.C. and that of the First, there intervened an epochal upheaval – the migrations during the Twelfth and Eleventh Centuries B.C. The Sea Peoples, rushing across Anatolia, swept away the powerful Hittite kingdom like a 'house of cards'…Chaldean and Aramaean tribes infiltrating into both southern Mesopotamia and Syria had already done much to change the situation in those areas, and a group of people who had not hitherto played a distinct separate role in history, the 'Hieoglyphic' Hittites, now emerged as heirs of Hittite power in north Syrian states… It seems evident as Sidney Smith and Frankfurt have pointed out, that in Late Assyrian times hybrid plants of these types were really 'sacred trees' and closely associated with the god Assur, even perhaps being a symbol of him. Morover they equate the 'sacred tree' of the seal designs with a cult object described by Sidney Smith as follows: '…at the New Year Festival in Assyria use was made of a bare tree-trunk, around which metal bands, called 'yokes' were fastend and fillets were attached.'Frankfort refers to the evidence that tall cedar poles ornamented with copper bands were set up at the portals of Assyrian temples and goes on to say that certain of our Late Assyrian hybrid designs '…are unintelligible as the rendering of natural trees, but not so if they represent the ritual object consisting of a pole ornamented with coper bands, cloth and ribbon…

'The story has been carried down to the point where the Greeks appear and take into their hands the end results of an evolution, the roots of which extend back into the Third Millennium B.C. In the later Eighth and in the Seventh Century B.C., when Greek rt was transformed under the potential influence of the Orient, vegetal motives became prominent elements in the Hellenic repertory. The work of Poulsen reaffirmed the tremendously important role played the Phoenicians in the transmission of oriental traditions to Greece. (Frederick Poulsen, *Der Orient und die Fruhgriechische Kunst*, Berlin, 1912). There has been much discussion as to the routes by which oriental influence reached the Greek mainland. Humfry Payne, for example, has emphasized the importance of Crete as an intermediary (Humfry Payne, *Necrocorinthia*, Oxford, 1931, pp. 4f.), whereas Wace and Blegen still consider that the main route went via Cyprus, Rhodes and Cyclades. (*Klio*, XXXII, 1929, 141f.) In any case, there can be no denying that oriental influences were carried by objects, such as small carvings of ivory or other materials and metal work, made for the most part in Phoenician workshops.' [unquote] Source: HJ Kantor, Plant ornament in the Ancient Near East, Chapter XVIII: Late Assyrian Plant Ornament, H. Frankfort, 1939, *Cylinder Seals*, London, p. 205. Sidney Smith, Early History of Assyria, p. 123. Revised: August 11, 1999.
http://oi.uchicago.edu/OI/DEPT/RA/HJK/HJKXVIII.pdf
http://oi.uchicago.edu/OI/DEPT/RA/HJK/HJKXX.pdf

See the Greek continuum of hieroglyptic art forms using Greek gems and Phoenician scarabs. http://tinyurl.com/2psl4a Hieroglyphs of lion or panther attacking bull or boar or antelope (Starting with a review of Sibri cylinder seals showing lion hieroglyphs the hieroglyphs are traced into Greek gems of Phoenician scarabs).

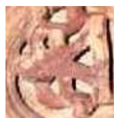
Comparable motifs of the flower-bud, volute and double-volute also occur on srivatsa ayagapatta. Scan 0053011 Huntington archive. http://huntington.wmc.ohio-state.edu/





Makara Bharhut, c. 100 BC Indian Museum, Calcutta Something of the origin of the makara, or at least its early composition in India, can be seen here. The water beast, confined beneath a ledge with kneeling rams that represent the realm of land, is pictured here with the snout of a crocodile, the head and forequarters of an elephant, the body of a snake, and the fins and tail of a fish. http://www.art-and-archaeology.com/india/calcutta/cm13.html

haangi 'mollusc, shell'; rebus: sangha, guild of smiths, e.g. lohar sangha attested in some inscriptions.





rotate left to see portable furnace comparable to the standard device on many Indus script seals.

a variant of s'rivatsa glyph; two fish-tails tied together; two jointed fishes; sangad.a 'furnace' (jointed animals); rebus: sangha; kolimi 'smithy, forge'; rebus: kolli 'fish'; go_nt 'to tie'; gud.i 'shrine'.
http://docs.google.com/View?id=ajhwbkz2nkfv_36gqrd6m
The hypothesis of the set of monographs related to mlecchita vikalpa at http://tinyurl.com/2sh5pd (Writing system) is that Phoenician workshops were mleccha workshops, where mlecchita vikalpa hieroglyphs evolved in the third millennium and second millennium BCE and related to the mleccha (meluhha) travels around the contact areas in search of mineral sources, tin, in particular. The underlying mleccha lingua franca of the civilization and contact area unravels, with particular reference to the repertoire of vis'vakarma karma_ra, kamar, smiths. Testing of this hypothesis will take us into the art world of Begram ivories.
S. Kalyanaraman 21 July 2007 kalyan97@gmail.com

Winged Disk and the Tree of Life



Wednesday, November 19, 2003 -

The owner of this seal can be identified from the cuneiform inscription which translates: 'Seal of Mushezib-Ninurta, governor, son of Ninurta-eresh, ditto, son of Samanuha-shar-ilani, ditto.' Samanuha-shar-ilani was ruler of Shadikanni (Arban in eastern Syria),

in 883 BC, and an Assyrian vassal - subject to the firm control of Assyria, and enjoying the wealth and security that such political domination provided.
During this period, seal designs were often cut on hard stones using cutting-wheels and drills. The image is similar to two wall reliefs from the throne room of King Ashurnasirpal II (reigned 883-859 BC) at Nimrud. The king, shown in mirror image, is protected by guardian genii sprinkling holy water from a bucket using what may be a fir cone or sponge. A stylized tree stands in the centre, symbolizing nature and the land of Assyria. Above is a god in the winged disc.
Length: 4.9 cm
Diameter: 1.7 cm
Found by H.C. Rawlinson and acquired by The British Museum around 1852
D. Collon, *First impressions: cylinder seals in the Ancient Near East* (London, The British Museum Press, 1987), pp. 76-7, fig. 341
A.H. Layard, *Discoveries in the ruins of Nineveh and Babylon* (London, J. Murray, 1853), p. 603
http://ancientx.com/nm/anmviewer.asp?a=20&z=1









"…two fully preserved reliefs from the Northwest Palace at Nimrud (Kalhi) display figures arranged in two superimposed registers. The upper one has representations of small, kneeling figures. The winged deities are wearing horned head gear and are touching the palmettes of the sacred tree with their hands. In the lower register, two winged, eagle-headed figures are facing each other while holding small buckets (situlae) and cones in their hands for the anointment of the sacred tree located in

the middle of the scene. The relief figures are separated by a broad central band with a cuneiform text 21 or 22 lines long. This so-called standard inscription of Ashurnasirpal II describes his greatness as a ruler, his military success, his invincibility, his building projects, but also his piety and adoration of the gods. ”
http://www.econ.iastate.edu/classes/econ355/choi/bab.htm



An eagle-headed, winged divinity stands facing a tree of life (the ends of the branches are just visible at the right edge). The figure was a small section of the wall decoration in the state apartments of the royal palace at Nimrud in northern Iraq, built by Assurnasirpal II, King of Assyria. The deity holds a bucket in one hand and in the other a spathe (leaflike sheath for the flowers) of the date palm.

http://www.dia.org/collections/ancient/mesopotamia/47.181.html



Anunnaki devas on outer portions of the mural, Sumerian humans on inner portion surrounding a depiction; "Tree of Life" with Anunnaki placed on Winged-Disc above.
http://en.wikipedia.org/wiki/Mesopotamian_mythology

See also: Parpola, S. (1993). *The Assyrian Tree of Life: Tracing the Origins of Jewish Monotheism and Greek Philosophy*. Journal of Near Eastern Studies, Vol. 52 No. 3, pp. 161-208

“In this article, Parpola identifies and analyzes a recurrent symbolic Tree in 4th millenium Mesopotamian iconography and then goes on to argue very persuasively that this image/idea is the origin for the Tree of LIfe popularized in Jewish Kabbalah.”
http://www.tarotforum.net/showthread.php?t=59229

“The Mesopotamian Tree

A stylised tree appears for the first time as an art motif with clearly religious

significance in ancient Mesopotamia. It already occurs in prehistoric graffiti and on pottery, and later becomes a favoured motif on seals, particularly in imperial glyptics. Under the Neo-Assyrian Empire (930-607 BC) it is found virtually everywhere: on cylinder and stamp seals, jewellery, glazed tile panels, sculptures, wall paintings and columns of royal palaces, royal garments, furniture, implements, helmets, weapons, and so on.
Art-historically, the Mesopotamian tree (in its many variant forms) without any question belongs to the same tradition as the later Jewish, Christian, Islamic, and Indian Tree of Life. The available, very abundant evidence leaves no doubt that as an art motif, the Tree spread from Mesopotamia to other parts of the ancient Near East, and that e.g. the typical first-millennium Israelite tree (two caprids climbing up an almond tree) and its later variant, the seven-branched lampstand (menorah), are both derived from earlier Mesopotamian models. Accordingly, art historians long used to refer to the Mesopotamian tree as the "Tree of Life," taking its affinity with the later Tree of Life as granted. However, there is a complication here. While Mesopotamian texts do contain incidental references to all kinds of mythical trees, the term "Tree of Life" is not unequivocally attested in Mesopotamia…I consulted some literature but could not find any satisfactory explanation of its meaning, much less a coherent theory of what it stood for. Some experts plainly stated they did not know; others speculated that it probably symbolised "fertility." (For this view see most recently B. N. Porter, "Sacred Trees, Date Palms, and the Royal Persona of Ashurnasirpal II," Journal of Near Eastern Studies 52 (1993), 129-139.)"
[Understanding the Tree of Life by
Simo Parpola (2004)] http://insideassyria.com/rkvsf/wwwboard/msgs/Article_2-2DUX.html

ad.aru 'twigs or branches of tree'. Rebus: aduru 'native metal'.

Tree glyph on punch-marked coins of India:

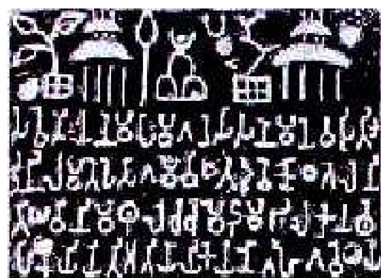
PATRAHA
MAYURBHANJ
PESHAWAR
NAGPUR, RAHALP
BHAGALPUR
AHRAURA
BAHAL
MIRZAPUR
VEMBAVUR
THATHARI
UJJAIN
BHILSA - FIND
PATRAHA
RAIRH
KAUŚĀMBĪ
ERAN
KANAUJ (1)
TAXILA (3)
UJJAYINI (4-5)
AYODHYA (1-3)
ALMORA (4)
UDDEHIKA (5)
KUNINDA
YAUDHEYA
TRIBAL COINS
SĀTAVĀHANA
COINS

http://sarasvati97.spaces.live.com/photos/cns!A74A2ADBFA0A3358!529/

KOSALA, BHIR-MOUND PATRAHA, GOLAKPUR	PUNCH-MARKED COINS
SWAT, BHIR-MOUND PATRAHA, AURIHAR	"
MAMDAR, MAGADHA BHIR-MOUND, AURIHAR PATRAHA	"
BHIR-MOUND, RAIRH, PATNA	"
AURIHAR, RAJGHAT JAUNPUR, AHRAURA	"
BHIMLI PATAN, NAMBALAM UJJAIN, BAHAL, KOSAM PATRAHA, TAXILA, BHIR-MOUND, THATHARI	"
BHIMALIPATAN, PATRAHA, MAGADHA, BHIR-MOUND, LALGANJ, GOLAKPUR, VEMBAVUR, SINGAVARAN	"
BHIR-MOUND, DHARWAR, PATRAHA, BAHAL, KARIMNAGAR, GULBARGA MAGADHA, SINGAVARANA	"
GULBARGA, PATRAHA, RAIRH, NAGARI FINDS	"

[Pl. 39, Tree symbol (often on a platform) on punch-marked coins; a symbol recurring on many tablets of SSVC].

Tree on platform/railing on Sohgaura copper plate:



The Sohgaura copper plate refers to a pair of kos.t.ha_ga_ra (dva_ra kot.t.haka); the two storehouses described as tri-garbha (i.e. having three rooms) are illustrated on line 1. (Fleet, JRAS, 1907). The illustrations indicate that the three rooms are in three storeys, with supporting pillars clearly seen. The inscription refers to the junction of three highways named Manavati, in two villages called Dasilimita and Usagama. The storehouses were made at this junction for the goods of people using the highways, which are indicated in line 3 by mentioning the three places to and from which they led. One of the names give is reognized by Fleet as Chanchu. (Fleet, JRAS, 63, 1894 proceedings, 86, plate, IA 25. 262; cf. Sohgaura copper plate/B.M. Barua. *The Indian Historical Quarterly*, ed. Narendra Nath Law. Reprint. 41)

Uninscribed coins of Eran-Vidisha :





1) Ruler : Uninscribed coins of Eran-Vidisha
2) Year : 2nd- 1st Century B.C.
3) Unit : Unknown , Copper
4) Obverse : Tree in railing , Nadipada, Taurine in semicircle , Swastika , Triangular headed
standard River with fishes and tortoises below .
5) Reverse : Blank
6) Reference : Nil





1) Ruler : Uninscribed coins of Eran-Vidisha
2) Year : 2nd- 1st Century B.C.
3) Unit : Unknown , Copper
4) Obverse : Tree in railing , Nadipada, Taurine in semicircle , Swastika , Triangular

headed

standard River with fishes and tortoises below .

5) Reverse : Blank



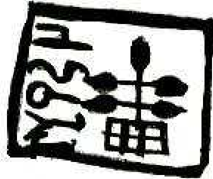


Illustration of Coin (Reverse)

1) Ruler : City state of Bhadravati , Vidarbha region
2) Year : Unknown (200 BC ?)
3) Unit : Unknown ? , Copper
4) Obverse : Elephant standing to right , Standard above Elephant
5) Reverse : Tree in railing; Inscription: Bhadavati
6) Reference : Similar Coin was Published by Mr Prashant P Kulkarni in ICS Newsletter No 1
(April 1990) as ' New Coins of Chhimuka Satavahana '

http://www.geocities.com/ancientcoinsofindia/ujain.htm

m0482At m0482Bt  1620

Pict-65: Gharial (or lizard), sometimes with a fish held in its jaw and/or surrounded by a school of fish.

On tablet m0482, the svastika (satthiya) follows the glyph of a tree branch '*aduru*'; hence the two signs may be read rebus as: *aduru* 'metal' + *sattva 'zinc'.* [Zinc was fundamental in creating the brass alloy used for vessels.] Vikalpa: Pa. *satthika*— 'belonging to a caravan'; *sa_rthika* Skt. 'companion on a journey'; **sārthavāha—** m. 'caravan leader' (Skt. Pa.Pkt.); *satthāha* id. (Pkt.)

Rim of jar 'kan.d. kan-ka'; rebus: kand. 'fire altar, furnace'; khanaka 'miner'. kolmo 'rice plant';rebus: kolami 'furnace'. Circumgraph glyph of oval: kut.ila 'bent'; rebus: kut.ila 'bronze'. The "E" glyph: Comb: **kangha** (IL 1333) *ka~ghera_* comb-maker (H.) Rebus: **kan:g** = brazier, fireplace (K.)(IL 1332) kan:kata = comb (Te.) Rebus: kan:gar = portable furnace (K.) Vikalpa: kut.i 'tree'; rebus: kut.hi 'smelter furnace for iron ore'. Vikalpa: **bar.ae**-bur.ui = to oil and comb someone's hair (Mundari.lex.) Rebus: bar.ea 'merchant' **bakhor.** = teeth of a comb (Santali.lex.) Rebus: **ban:gala** = kumpat.i = an:ga_ra s'akat.i_ = a chafing dish, a portable stove, a goldsmith's portable furnace (Te.lex.)

mangar ‘crocodile’; kolli ‘fish’; rebus: kaula mengro ‘smith’ (Gypsy).

Some glyphs on line 1: kut.hi = tree; rebus: kut.hi = smelting furnace; kos.t.ha_ga_ra = storehouse; s'u_la = spear; cu_l.a = kiln; kan.d.kanka = rim of jar; rebus: copper furnace; bat.a = quail; rebus: kiln.
Bunch of twigs = ku_di_, ku_t.i_ (Skt.lex.) ku_di_ (also written as ku_t.i_ in manuscripts) occurs in the Atharvaveda (AV 5.19.12) and Kaus'ika Su_tra (Bloomsfield's ed.n, xliv. cf. Bloomsfield, American Journal of Philology, 11, 355; 12,416; Roth, Festgruss an Bohtlingk, 98) denotes it as a twig. This is identified as that of Badari_, the jujube tied to the body of the dead to efface their traces. (See *Vedic Index*, I, p. 177).
ad.aru twig; ad.iri small and thin branch of a tree*; ad.ari* small branches (Ka.); *ad.aru* twig (Tu.)(DEDR 67). Cf. at.artti = thickly grown as with bushes and branches (Ta.) *d.ar a* branch; *dare* a tree; a plant; to grow well; ban: *darelena* it did not grow well; *toa dare* mother, the support of life (Santali) Rebus: aduru ‘native metal’.
kut.hi kut.a, kut.i, kut.ha a tree (Kaus'.); kud.a tree (Pkt.); kur.a_ tree; kar.ek tree, oak (Pas;.)(CDIAL 3228). kut.ha, kut.a (Ka.), kudal (Go.) kudar. (Go.) kut.ha_ra, kut.ha, kut.aka = a tree (Skt.lex.) kut., kurun: = stump of a tree (Bond.a); khut. = id. (Or.) kut.a, kut.ha = a tree (Ka.lex.) gun.d.ra = a stump; khun.t.ut = a stump of a tree left in the ground (Santali.lex.) kut.amu = a tree (Te.lex.)
kut.i, ‘smelting furnace’ (Mundari.lex.).kut.hi, kut.i (Or.; Sad. kot.hi) (1) the smelting furnace of the blacksmith; kut.ire bica duljad.ko talkena, they were feeding the furnace with ore; (2) the name of e_kut.i has been given to the fire which, in lac factories, warms the water bath for softening the lac so that it can be spread into sheets; to make a smelting furnace; kut.hi-o of a smelting furnace, to be made; the smelting furnace of the blacksmith is made of mud, cone-shaped, 2’ 6” dia. At the base and 1’ 6” at the top. The hole in the centre, into which the mixture of charcoal and iron ore is poured, is about 6” to 7” in dia. At the base it has two holes, a smaller one into which the nozzle of the bellow is inserted, and a larger one on the opposite side through which the molten iron flows out into a cavity (Mundari.lex.) cf. kan.d.a = furnace, altar (Santali.lex.)



To present the context in which the writing system evolved, an overview on Sarasvati civilization is presented based on exquisitely drafted perspectives excerpted below, to support/test/validate a hypothesis that the invention of metals and alloys led to the imperative of inventing the writing system.

The land of "Meluhha" mentioned in Mesopotamian cuneiform tablets was probably the Indus Civilization. Trade contacts between the Indus Civilization and the Persian Gulf and Mesopotamia are evident from Indus signs engraved on button-shaped Persian Gulf seals and the unique carnelian beads and ornaments found in these regions. Chlorite stone vessels manufactured in Iran have also been found throughout the Indus and Mesopotamian regions. Semi-spherical copper ingots probably originating in Magan (Oman) provide further evidence of widespread trade. Various goods traded from east to west, as well as from west to east, surely spread beliefs and philosophies along with material goods.





http://pubweb.cc.u-tokai.ac.jp/indus/english/section02.html

Time and mudra (akshara mushtika kathanam)

Early farming villages situated among the hills of Balochistan (circa 7000 - 2300 B.C.)

Balochistan hills

Early farming village cultures developed throughout the Balochistan hills after 7000 B.C. Situated geographically between the Iranian plateau and the Indus plain, the area is a natural zone for interaction between the two regions, and evidence for cultural influence from the West is found even in these early settlements.

Figurines discovered at Mehergarh.
Figurines discovered at Mohenjodaro



Ornaments discovered in many sites of Balochistan.



Types of jewellery worn (Mohenjodaro). Courtesy of Prof.J.M.Kenoyer(University of Wisconsin)





Long carnelian beads, sometimes more than 12 centimeters long, were a specialty of the Indus Civilization. These beads have been found as far away as the Arabian Gulf and Mesopotamia.
Collections of beads were sometimes stored in small pots. One such collection of beads and other objects from several periods was found in a small pot inside a room at Harappa dating to circa 1800 B.C. (the Cemetery H Culture at Harappa). This collection may represent the effort of someone to collect beads that had been lost in earlier periods or passed down by previous generations.



Painted Grey Ware was abundant in the first half of the third



millennium B.C. This well-fired pottery is typically decorated with geometric patterns and fish and animal motifs (with characteristic "large eyes"), all in black entirely on the inside of the pottery. Some of these designs are very similar to pottery designs found later in the Indus Civilization.

Mehrgarh is the earliest known farming settlement in South Asia (established circa 7000 B.C.), the first of several villages to appear among the hills of Balochistan along the western edge of the Indus plain. Stone sickles found at Mehrgarh provide definite evidence of wheat cultivation. The people cultivated wheat and barley and raised sheep, goats and cattle, all traditions that paved the way to civilization. Soon after, they began making painted pottery, ornaments and terracotta figurines representing both humans and animals.

The development of early settlements on the Indus plain (circa 3000 - 2600 B.C.)



These globe-shaped, short-necked pots from Kot Diji are characteristic of Early Harappan material culture. On one well-known example, a figure with horns and flowers (or stars?) probably representing a deity is painted below the neck of the pot on a red field.



Painted pottery with a variety of motifs appeared in many areas of South Asia prior to the rise of the Indus Civilization. Images of horned deities were sometimes painted on short-necked pots such as this one from the early levels at the site of Rahman Dheri, where fish motifs on pottery were also common.

Settlements began to appear on the Indus plain at around 3500 B.C. This laid the foundation for the Indus Civilization. The use of seals indicates active trade, while models of yokes for cattle and sophisticated copper/bronze implements attest to a well-developed agricultural society. Motifs on pottery such as humans wearing

headdresses of buffalo horns appear to be early manifestations of common beliefs that continue in the later Indus Civilization.



Moulds for figurine heads

Most figurines were handmade, but in a few cases where intricate detail was desired, moulds were used. Here, a bull figurine has been given almost life-like detail through the use of a mould for the head.



Terracotta cakes

Triangular terracotta cakes were common at most Indus sites. Earlier, some scholars proposed that they were used as toilet paper. However, since many of them have been found inside kilns and hearths, it is more likely that they were used for retaining heat during pottery firing and/or cooking. A few of the triangular cakes are incised with human figures, which has led some scholars to interpret them as objects used in fire rituals. Terracotta cakes were either triangular or round/oval and sometimes had a finger impression in the center.



The discovery of the figure of the "Priest King"

Artisans

This steatite sculpture is popularly known as the "Priest King". It probably represents a person of very high rank judging from the elaborate clothing and ornamentation. The eyes originally contained shell inlay and would have been somewhat realistic in appearance. The robe may have been navy or green with trefoil patterns filled with red pigment with white borders. The back of the head was flattened, possibly in order to affix a horned headdress as a symbol of sacred authority.

Craft Production at Gola Dhoro |



Copper Artifacts

Copper Working

Compared to the small size of the settlement the number of copper objects recovered is very high, which includes a copper vessel, containing eight bangles and an axe perhaps stored for recycling the precious metal, besides a variety of other copper objects. One of the important discoveries from southern half of the settlement outside the fortification is the recovery of unique copper knives with bone handles or protective sheath meant to protect the sharp working edge of the tool. A unique copper battle-axe "parshu", is also a very interesting find from this area, the small size of the battle - axe perhaps suggesting some ritualistic function.

These unique copper knives were recovered in association with large quantities of animal and fish bones and at present we are trying to understand if these knives had any functional relation with butchering and preparation of the fish for drying etc. It is very rare to come across such unique knives with well-preserved handles or covers, hence throw up a challenge for archaeologists to conserve them as it is.

No evidence of copper smelting has been found from the site. However, recovery of a few heavily sand tampered clay crucibles with copper adhering in them, perhaps point to the fact that they were used in melting the copper. Many of these copper objects were perhaps made at the site using sand molds that would leave very little or no traces for the archaeologist.
http://www.harappa.com/goladhoro/copperworking.html



Pot furnace at Lothal

Stone sculptures of other males

These sculptures have

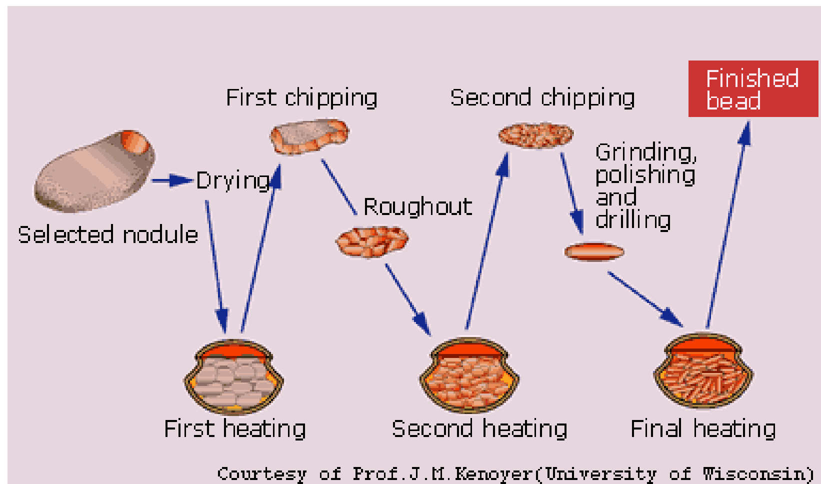


some formal similarities with the "Priest King" such as the way that the robe is worn with the right shoulder bare. They probably represent very important people or even deities. The seated posture with one knee raised may have been considered the most proper way of sitting during this period or it may have had symbolic significance.

The discovery of the figure of "Acharya" and a graphic reconstruction of the figure



(courtesy of Professor Michael Jansen (RWTH, Aachen University)) / Copper and bronze implements included farming implements and tools, fishhooks, weapons, ornaments and vessels. These metal implements may have served as status symbols. They were manufactured in two ways: 1) by casting (pouring molten metal into moulds); and 2) by heating and hammering the metal into shape.



Drilling a hole Carnelian beads were made by shaping and heating agate several times to change the color to a deep orange or red and then drilling a hole through the bead with a stone drill, sometimes more than 12 centimeters. Today, the entire process is the work of professional craftsmen whose technology has been handed down from generation to generation.





This head ornament was made of steatite microbeads, each measuring only one millimeter in diameter. It was found on the head of a male buried in a cemetery at Harappa and probably served as a hair decoration.



Manufacture of microbeads
The manufacture of these incredibly tiny microbeads involved drilling each rough-cut piece of steatite carefully while holding it on the palm of the hand, stringing them together and polishing them into the characteristic disc shape on a flat stone. The beads were then hardened by carefully controlled heat. This is but one technological process that demonstrates the skill and versatility of the Indus craftspeople.



Ancient Lothal as envisaged by The Archaeological Survey of India. The next 15 slides show the remnants of this ancient Indus port city in the state of Gujarat, India.

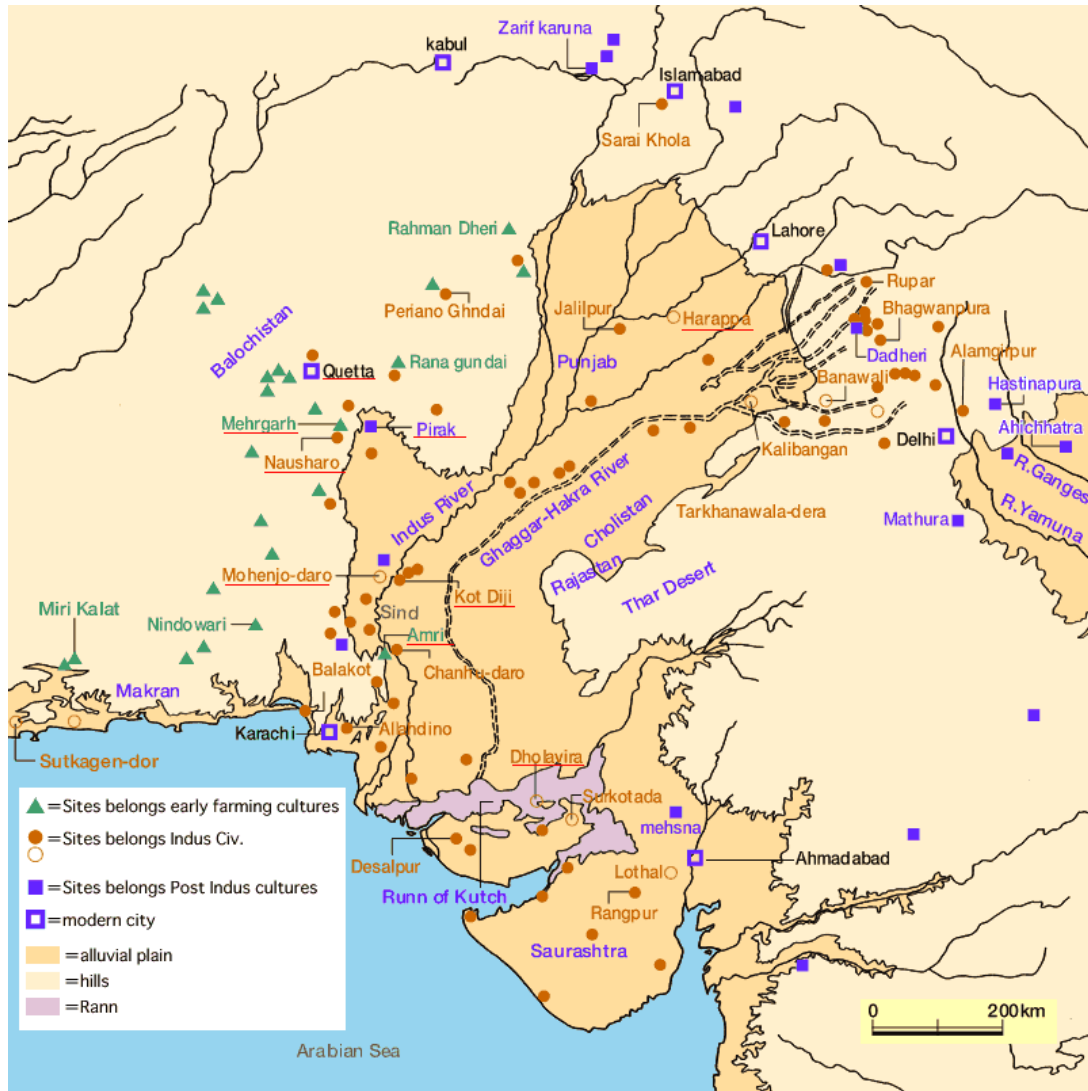
Dockyard at Lothal in summer.

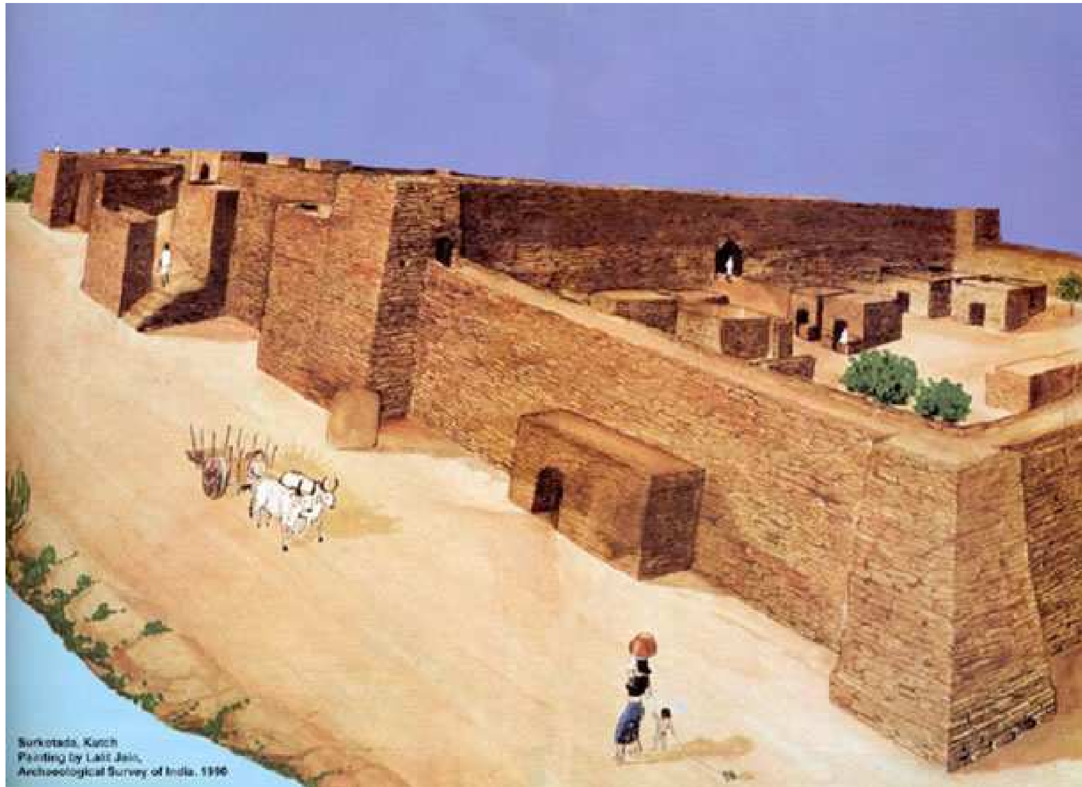
Warehouse at Lothal.





http://www.harappa.com/lothal/index.html


Zarif karuna
kabul
Islamabad
Sarai Khola
Rahman Dheri
Lahore
Periano Ghndai
Jalilpur
Harappa
Rupar
Bhagwanpura
Balochistan
Quetta
Rana gun dai
Punjab
Dadheri
Alamgirpur
Banawali
Hastinapura
Mehrgarh
Pirak
Kalibangan
Delhi
Ahichhatra
Nausharo
R.Ganges
Indus River
Ghaggar-Hakra River
Cholistan
Tarkhanawala-dera
R.Yamuna
Mathura
Mohenjo-daro
Rajastan
Kot Diji
Thar Desert
Miri Kalat
Sind
Nindowari
Amri
Balakot
Chanhu-daro
Makran
Karachi
Allahdino
Sutkagen-dor
Dholavira
Surkotada
mehsna
Ahmadabad
Desalpur
Lothal
Runn of Kutch
Rangpur
Saurashtra
0
200km
Arabian Sea
=Sites belongs early farming cultures
=Sites belongs Indus Civ.
=Sites belongs Post Indus cultures
=modern city
=alluvial plain
=hills
=Rann



Above: Conceptual illustration of Surkotada, Indus Civilization Site, Gujarat. Painting by Lalit Jain, Archaeological Survey of India, 1990.



Above: Computer reconstruction of the site of Dholavira in Western Gujarat, the most impressive and largest of the Indus ancient sites in India. Copyright NHK TV, Japan.



Close-up of the citadel



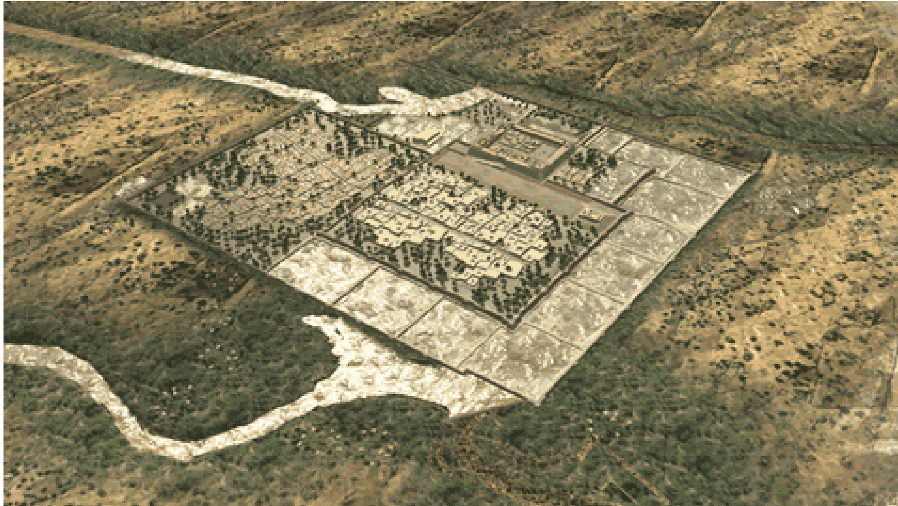


Northern gateway of the Citadel.

The signboard inlaid with 10 Indus signs.

The city was surrounded by a series of square walls, with a "Citadel" which rises 15 meters above the "Middle Town" and the "Lower Town". A signboard with ten huge Indus signs found on the floor of a room at the North Gate was probably originally displayed above the gateway. Although the Indus script written on the signboard is still undeciphered, it is likely that the inscription represents the name of the city or the name of a god or a ruler.

Supervisor for the computer graphics: R. S. Bisht (Archaeological Survey of India)
Computer graphics: Osamu Ishizawa, Yasuyo Iwata and Nobuyuki Matsuda (Taisei Corporation) in collaboration with NHK.



A view of the entire city with its "Citadel", "Lower Town" and "Middle Town" surrounded by square walls http://pubweb.cc.u-tokai.ac.jp/indus/english/2_4_03.html



The gate of the "LowerTown"



Excavation of the wall of the "LowerTown"



Graphic reconstruction of the gate



Excavation at the northern end of the "Citadel"

The recent excavations at Harappa were begun in 1986 by the American team of the Harappa Archaeological Research Project jointly with the Department of Archaeology and Museums of Pakistan. New discoveries and reevaluations of previously excavated areas have contributed greatly to our understanding of this site, which was the type-site of the Harappan (or Indus) Civilization.



The site was inhabited continuously from at least 3300 B.C. until several hundred years after the decline of the Indus Civilization (the "Cemetery H" Culture at Harappa), which represents one of the longest periods of occupation at any Indus site. Recent excavations have focused on the development of the Indus script and the early and late

phases of the Indus Civilization at Harappa. (For more details, see the link for "Harappa.com".)

Above: The so-called "granary" of Harappa is found on Mound F. It is a brick structure that was built on a massive brick foundation over 45 meters north south and 45 meters east-west.



The so-called "Great Granary" in Mound F. Its earliest levels date to 2450 B.C. A similar structure, also about 50 meters long and built on a massive brick or mud-brick platform, was found at Mohenjo-daro. Influenced by European precedents, early archaeologists quickly identified the buildings as granaries. At Harappa, two sets of 6 rooms are aligned on either side of a central passageway.

These platforms are often called workmen's platforms, and were first thought to have been used to thresh grain for what was also thought to have been the nearby "Great Granary." http://www.harappa.com/walk/147.html





Mohenjodaro: Computer graphics reconstruction of the "Lower Town" by Fujitsu Co.(contact: awaji@jp.fujitsu.com)



Above: The 'Great Bath' is without doubt the earliest public water tank in the ancient world.



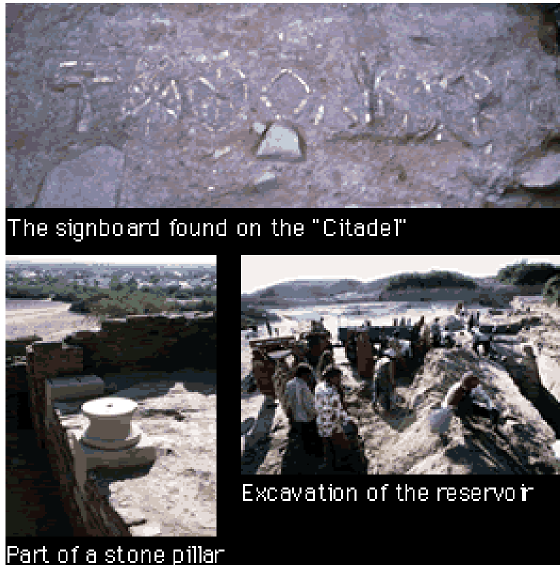


Excavation of the reservoir

Above: Rock-cut reservoirs and underground storm water drains showcase the sophistication of early Indus civilization at Dholavira and other sites.

Indus and Harappan Architecture – Examples

Dholavira: signs on sign board, stone pillars used, rock-cut reservoir.


The signboard found on the "Citadel"
Part of a stone pillar
Excavation of the reservoir



These giant ringstones are similar to ones found in Mohenjo-daro and Dholavira. Local legend claims they were the rings of a giant 17th century saint (Baba Nur Shah) who is buried on Mound AB. Early excavators believed that were significant to the ancient Indus religion. Today, archaeologists think that they were used to secure wooden posts at gateways to the city. http://www.harappa.com/walk/21.html



Ringstone, Mohenjodaro. http://www.imagesofasia.com/subject/html/mohenjodaro/Ringstones.html

Some degree of regional variation within the Indus Civilization is understandable

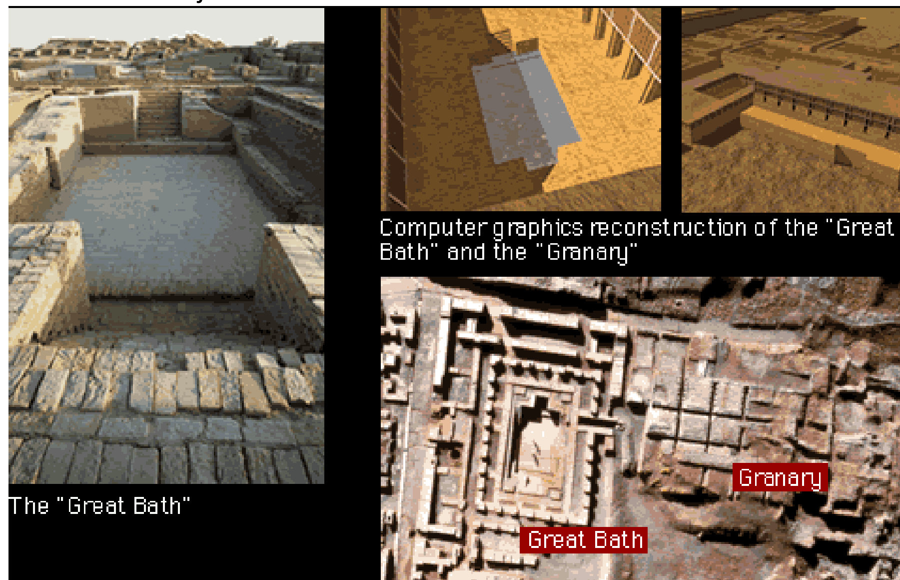

Stone construction -Dholavira
Brick construction -Harappa





given its vast geographical expanse and variation in resources. For example, baked bricks were commonly used for construction at Mohenjo daro in Sind and at Harappa

in the Punjab where stone is rare, whereas limestone masonry was more common at Dholavira in Gujarat.

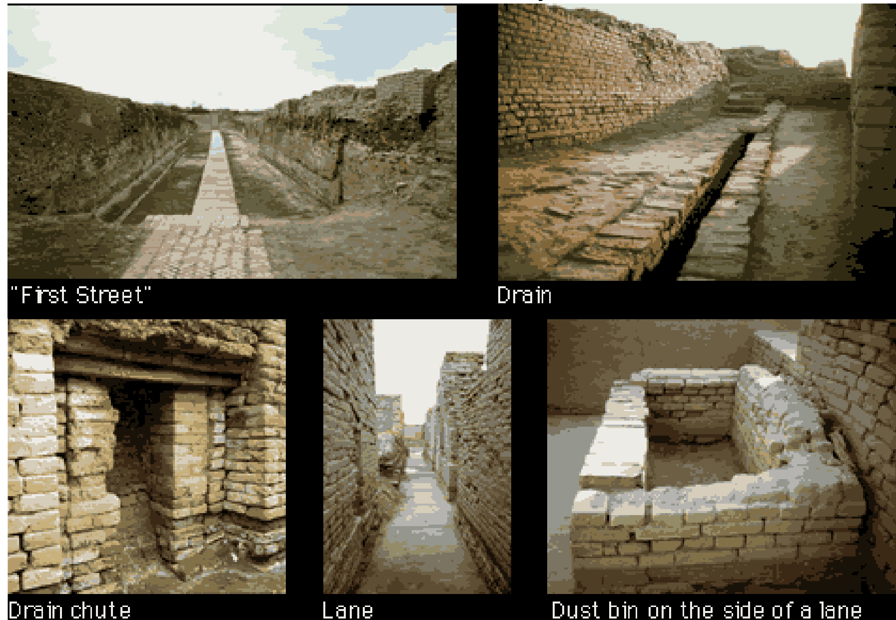


Computer graphics reconstruction of the "Great Bath" and the "Granary" by Fujitsu Co.(contact:awaji@jp.fujitsu.com)
Aerial photograph of the Great Bath and the Granary : Courtesy of Prof.M.Jansen(RWTH, Aachen University)
The two most well-known structures on the "Citadel" at Mohenjo daro are the "Great Bath" and the "Granary". Ritual bathing may have been carried out at the "Great Bath" as part of rituals for such concerns as a plentiful harvest and peace in society. Crops may have been brought for storage in the "Granary" and later distributed to craftsmen such as potters, jewelers and merchants who resided in the city.



Granary, SD and REM Area, Mohenjodaco. The granary at Mohenjo-daro was planned with bays to receive carts that delivered crops from the countryside. Constructed on top of a tapered brick platform, this structure had a solid brick foundation that stretched for 50 meters east-west and 27 meters north-south. Narrow passageways divided this foundation into 27 square and rectangular blocks. Two passageways ran east-west and eight ran north-south.
http://www.imagesofasia.com/mohenjodaro.php

Reconstruction of the Great Bath of Mohenje-daro



The "Lower Town" was divided into a number of blocks by a grid of straight streets running north-south and east-west, and each block was further divided by small lanes. Some houses had rooms with wells, bathing rooms (paved with baked bricks) and even toilets. Waste water was drained out of the houses through drain chutes built into the side walls that fed into a system of drains built alongside the lanes and streets.

At Mohenjo daro, the number of rooms in the houses in the "Lower Town" varied



from two to more than twenty; and one out of three houses had rooms containing wells.



Terracotta model of a house

Some terracotta objects with carved designs have provided rare examples of architectural features such as windows or doorways, and perhaps even the general structure of the houses of the Indus Civilization. Thresholds and window frames were probably made of wood and then set into baked brick walls. Windows may have been covered with cloth curtains or carved screens. The house depicted in this model may have originally had two stories since part of an upper threshold is preserved.



Models of bullock or ox carts like this one with a curved frame probably had wooden components for attaching the wheels and for protecting and containing the load. People may have even used these carts to peddle pottery or other goods. The colored patterns on some of the wheels may indicate that the wheels were made from joined wooden planks, like some of the carts still found in parts of Pakistan. Other designs may have represented spokes. Terracotta models of yokes that would

have been used to hitch animals to these carts (or to plows) have also been found at Nausharo.



Model of a plow

This model of a terracotta plow in almost perfect condition was recovered from the site of Banawali. It is S-shaped with a sharp edge near the point and a hole at the end of the central component to fasten it to a yoke. The shape of the plow is exactly like the shape of the plows used in modern villages in South Asia.

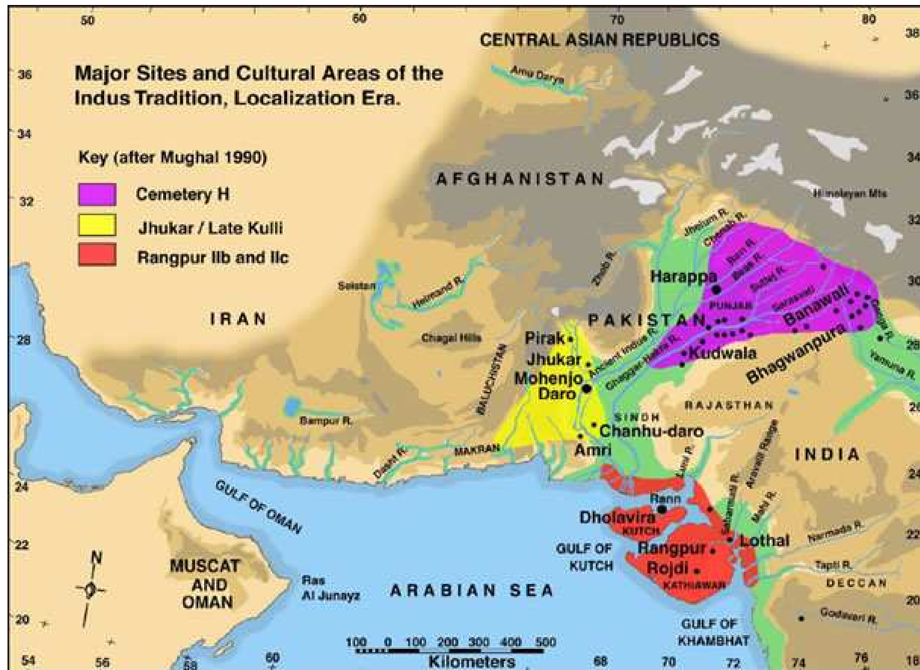








Indus Heritage Centre- Examples of Artifacts in the MSU Collections



The distance from the mouth of the Indus River to Mesopotamia is approximately 2000 kilometers. Indus merchants from sites such as Dholavira and Mohenjo daro





probably covered this distance by sailing along the coast to various ports along the shores of the Arabian Gulf and Mesopotamia.



Across the sea

The depiction of a boat on this terracotta tablet provides important evidence regarding navigation in ancient times. This boat had a hull made of bound reeds with a cabin at the center and a double rudder near the stern. The birds depicted on this boat may provide evidence of the practice of releasing birds from boats in order to determine the direction of land from the open sea.

The lands of "Dilmun", "Magan" and "Meluhha" that are mentioned in Mesopotamian cuneiform tablets are believed to be Bahrain, Oman and the Indus Civilization, respectively. The various goods traded from east to west, as well as from west to

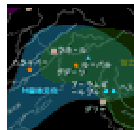
east, surely spread beliefs and philosophies along with material goods.
Inscriptions on clay
713: Cone inscription of Ur-Nammu, king of Ur (2112-2095 B.C.) mentioning ships of Magan (Oman). From Ur, Ur III period.



714: Cuneiform tablet listing the cargo of a boat going to Magan. From Lagash (Girsu), Ur III period, circa 2100 B.C.
715: Cuneiform tablet recording the inventory of deposits of barley available for distribution, including one in a granary in the village of Meluhha. This village was located in the old city-state of Lagash. The name presumably reflects the fact that the original founders or inhabitants of the village came from Meluhha. From Lagash, Ur III period, dated to 2047 B.C.
Stone vessels

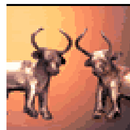
Elaborately carved vessels of a soft stone known as chlorite made in eastern Iran or Bactria (Afghanistan) were important trade items in the late third millennium B.C. They were exchanged over a vast area that included Mesopotamia, the Arabian Gulf and the Indus valley.

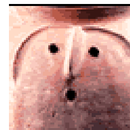
Cultures that followed the Indus Civilization (circa 1800 - 1000 B.C.)


Map


Cemetery H Culture


Pirak


The "Quetta Hoard"


Gandhara Grave Culture

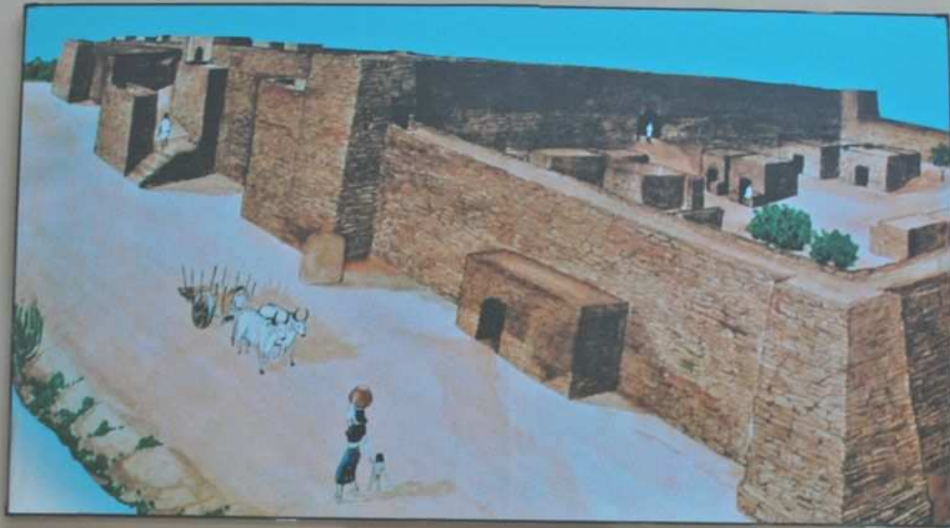

Copper Hoard Culture


Painted Grey Ware Culture

From around 2000 B.C. onwards, new regional cultures gradually emerged. Among these were the Cemetery H Culture of the Punjab, which was strongly influenced by the preceding Indus Civilization, and the cultures represented by Pirak in Sind, the "Quetta Hoard" and the Gandhara Grave Culture. All exhibit some Central Asian influence. Further eastward in what is now northern India, the Copper Hoard Culture and the Painted Grey Ware Culture, which are both believed to have been associated with the Indo-Aryan speakers, developed. Evidence of new traditions such as urns containing cremated bones and ashes appear, especially in the Cemetery H and the Gandhara Grave cultures. Domesticated horses and camels were also fully utilized for the first time in South Asia during this period.
Sources:
http://www.globalheritagefund.org/where/indus.html
http://pubweb.cc.u-tokai.ac.jp/indus/english/2_5_02.html



Density of settlements on Sarasvati River Basin


FORTIFIED SETTLEMENT : SURKOTADA


Figurines
Begging dog (Terracotta)
Monkey (Faience)
Fighting dog (Terracotta)
Female figure (Terracotta)



URBAN LAYOUT : HARAPPA

Miscellaneous objects



Shell bangles from burial



Double spiral brooch with steatite and gold inlay



Faience bangle



Bronze plate



Conch shell bangle



Silver spiraled bangles

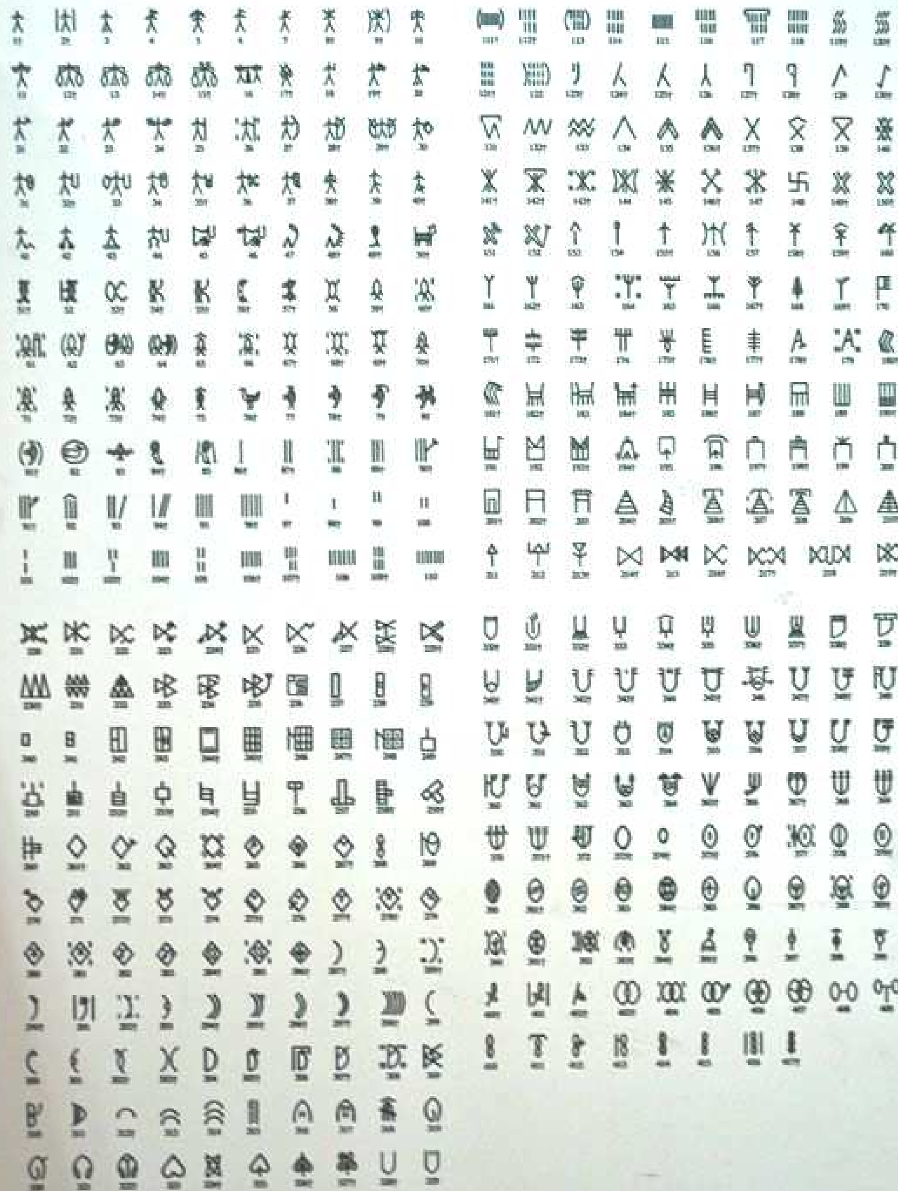


Carnelian and gold pendant or hair ornament, Harappa



Bronze cooking vessel


THE DOCK
LIFE IN LOTHAL 4000 YEARS AGO
© shunya.net



http://www.shunya.net/Pictures/NorthIndia/Chandigarh/Chandigarh.htm

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